



U.S. Department
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Proceedings of the **UMTA/APTA** Workshop on Fixed Guideway Planning

June 12-14, 1991



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**Philadelphia, Pennsylvania
June 12-14, 1991**

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EXECUTIVE SUMMARY

INTRODUCTION

The Urban Mass Transportation Administration and the American Public Transit Association held a special workshop on fixed guideway planning on June 12-14, 1991. The purpose of the workshop was to facilitate an exchange of information on fixed guideway planning. In addition, the workshop was to serve as a forum to discuss the UMTA guidance documents concerning the planning phases of major capital investment projects. The format of the workshop was developed to maximize the participants' opportunity to interact in small groups by using breakout sessions to discuss specific questions about key issues that had been highlighted in the plenary sessions.

This workshop summary is organized around these plenary and associated breakout sessions and provides a brief summary of the plenary sessions and an overview of the major issues discussed in the breakout sessions. The reader is encouraged to read the entire report to obtain a more detailed understanding of what the participants discussed.

STRUCTURE OF THE PROCESS

Sam Zimmerman opened the Plenary Session with a brief background and description of the UMTA defined planning process, its importance and what it is and is not trying to accomplish. He ended with suggestions on what needs to be done in order to do a better job in the following areas: 1) creating evaluation methods, 2) integrating financial

and transportation planning, 3) defining alternatives, 4) evaluating the soft issues, and 5) technically managing the Alternatives Analysis process. *Ed Colby* followed with first hand observations of some of the pitfalls of the current process, noting that transit is being held to a higher standard than railroad or highway projects, and argued for flexibility in order to respond to local needs without running counter to conflicting or inhibiting Federal requirements. *Paul Bay* pointed out four specific problems with the current process: the method of funding, incomplete information on the reason for and how the process works, lack of coordination with FHWA and other agencies involved in urban development, and the corridor approach to planning. *Michael Meyer* concluded with the need to restructure the transportation planning process to reflect local policies and non-transportation externalities (air quality, noise, and economic development) in a redefined 4-C process that incorporates credibility, provides consistency, has cooperation from all affected actors in developing an accepted funding package, and results in cost-effective decisions.

Major items discussed in the Breakout Session included:

Importance of External Influences on Planning

Perceived and real differences in planning for highway and transit projects and the impact of the differences on the decision making process.

The potential in today's environment for transportation planning to exert more influence than has occurred over the past 10 years, in particular through the 1990 amendments to the Clean Air Act and the resulting conformity regulations.

The likelihood that the reauthorization of the Surface Transportation Act will make transportation planning more significant through an increase in funding, a more pivotal role for the MPO's in transportation planning, and a greater concern for multimodal planning.

Strengths and weaknesses of UMTA's fixed guideway planning process

The reluctance of local officials to consider the UMTA fixed guideway planning process relevant to their needs inhibits the ability of that process to furnish the information necessary for local decision-makers to make decisions.

The potential for making the fixed guideway planning process more relevant to local decision-makers, either by better explaining what the process is, by allowing locally relevant issues to be part of the evaluation, or by streamlining the process to provide for more timely information.

The usefulness of the requirements for narrowing the alternatives under consideration, for undertaking a financial analysis, and for highlighting the impacts of each alternative.

Role of system planning

The need to enhance the system planning element of the fixed guideway planning process by moving activities now undertaken in AA into the system planning element; in particular,

developing ridership models during system planning.

The need for more attention by both the federal agencies and the transit industry in considering a truly multimodal perspective, in order to make tradeoffs between highways and transit alternatives, as well as the development of a financing structure that does not introduce modal bias into the decisionmaking process.

Credibility in the fixed guideway planning process

In order for both oversight agencies and local officials to view the process as credible, it must find real answers to the questions being asked.

The potential for obtaining credibility through: analytical tools that are sensitive to uncertain outcomes and are able to incorporate this uncertainty into the evaluation process; use of peer review groups; and development of evaluation criteria that are relevant to local officials' concerns.

Importance of operations planning

The role of good operations planning in both system planning, by defining problems and looking at system concepts and technology tradeoffs, and in corridor analysis, by checking operating assumptions, confirming institutional feasibility of the alternative plans, and assessing the reasonableness of operating performance and cost assumptions.

The role of operating plans in assessing the coordination and complementary aspects of fixed guideway services and the use of outside peer groups to obtain this operations expertise.

ALTERNATIVES DEFINITION

Don Emerson opened this Plenary Session with a statement of the importance of the alternatives definition throughout the process; a general description of what kinds of alternatives should be studied; and the six principles for defining individual alternatives, in particular, consistency in assumptions and optimization of the operating plan for each alternative. *Greg Benz* discussed the characteristics of various alternatives focusing on the importance of the conceptual definition of alternatives in solving defined transportation problems and when in the process certain types of issues should be addressed. *Ken Goon* looked at the issue from the local perspective and concluded that alternatives need to address a specific set of prioritized needs, should be minimal in number and have enough flexibility and level of detail so that all issues can be understood.

The Breakout Session discussion focused on the following issues:

No-build Alternative

The effect of the scope and maturity of the local area's current transportation system on the transit and highway projects to be included in this alternative.

Political and financial constraints on transit service improvements, beyond what exists today, being part of the no-build alternative.

Role of the system planning process in defining a no-build highway network, especially as it relates to what is politically and financially feasible.

Effectiveness of sensitivity analyses to examine the impact of variations in the assumed highway links.

Inclusion of highway projects as alternatives to transit projects.

Use of the no-build alternative, rather than the TSM alternative, as the basis for evaluation.

TSM Alternative

Current experience in achieving UMTA's expectation that the TSM alternative serve both as a good baseline for comparison with other alternatives as well as a separate, "moderate cost" alternative.

The ability of the TSM alternative to serve any local purpose, especially in those cases where local officials have already determined a preferred mode technology.

The role of TSM planning in system planning, especially in responding to air quality requirements.

EVALUATION

Ken Mowll opened this Plenary Session with remarks on the importance of the evaluation process. He described some of the current experiences surrounding a framework which looks at how well each alternative achieves stated goals, how much it costs, its affordability, and the equity tradeoff between who pays and who benefits. *Daniel Brand* followed with the background to and an explanation of the UMTA cost effectiveness index and concluded that because the index is not well understood, UMTA should consider elements of a locally carried out benefit-cost analysis as a supplement to the index. *Steve Polzin*, after noting that the current process does not support actual decisionmaking, concluded with a series of insightful observations about the pitfalls in the existing technical process and some suggested changes.

Evaluation and Cost-Effectiveness were the focus of the breakout session discussions:

The critical need for a coherent evaluation process, where information is synthesized and presented to decisionmakers.

The appropriateness of the evaluation factors required by UMTA, i.e., effectiveness, cost-effectiveness, financial feasibility, and equity, in forcing local officials and the public to think about issues that may not have been thought of or which might have been ignored.

The appropriateness of the amount of attention given by UMTA to the cost effectiveness factor in relation to effectiveness, which estimates the benefits that are expected to occur; financial feasibility, which provides a reality check on the plans that are being considered; and equity, which indicates who is benefiting and who is paying the costs.

The extent to which the UMTA required evaluation factors result in better planning practice, and ultimately in better transit project decisions.

Changes needed in the application of the cost effectiveness index and the threshold values, especially changes necessary to make it more useful to local decisionmakers and applicable to multimodal planning.

The potential for multiple standards of cost-effectiveness, especially a local benefit/cost ratio which would be more acceptable to local officials.

The need to update UMTA's cost-effectiveness threshold values to reflect changes in costs that have occurred since

they were first formulated, and the need for transit industry involvement in this process.

FINANCE

Edward Thomas set the stage for this Plenary Session by describing the framework and role of financial planning and analysis in the capital investment development process, including possible financing options; identified pressing financial analysis issues; and recounted problems in assigning and costing risk. *Sharon Greene* followed with description of the evolution of the UMTA process and an overview of the financial analysis performed at the varying stages of the fixed guideway planning process and finished with a very thorough analysis of the major issues facing any agency undertaking a financial analysis. *Douglas Wentworth* concluded with an insightful and sometimes humorous look at the various factors affecting forecasts of O&M costs, fare revenues, tax-based revenues, and capital costs, emphasizing the need for an annual revenue/cost breakout which reflects the uncertainty of the assumptions, and ended with some views on the potential for debt financing.

The Breakout Session concentrated on the Importance of Financial Analysis:

The importance of financial analysis for transit planning, even where dedicated sources of funds exist or where the investment decision is considered to be, by definition, for the public good and thus "costless".

The tradeoff between an early focus on financing in the decisionmaking process, which helps bring realism to planning, and excessive/premature focussing on how to pay for a project rather than on what is needed, which can unnecessarily restrict

the types of improvements to be considered.

The important of financing O&M needs in relation to the capital program.

The mechanism for including "reality checks" in the process to make sure that project planning is realistic and incorporates funding strategies to pay for an adopted project but avoids unrealistic expectations about what can be achieved.

Ways to strengthen UMTA's current financial planning guidance with respect to replacement costs, leveraging existing agency assets for financing the proposed project, and the use of financial benchmarks to compare one agency's program with others.

The need to integrate the AA/DEIS project planning process with an agency's on-going financial activities.

FUTURE DIRECTIONS

No Plenary Session preceded the individual Breakout Sessions which focused on ways to both improve and provide more information about the fixed guideway planning process.

UMTA Guidance Needs

The participants identified the following areas for needed additional guidance from UMTA--system planning, unified DOT guidance on multimodal planning, air quality analysis, turnkey project process, preliminary engineering, and environmental analysis.

UMTA/APTA Research Needs

With regard to research, the following topics were considered to be important:

- * Catalogue real experience of existing fixed guideway systems, such as physical characteristics (# of vehicles, # of rail vehicles, etc.), O&M characteristics, ridership and environmental impacts.
- * Develop a methodology and criteria for undertaking a true multimodal planning process.
- * Examine forecasts and real experiences to determine how close forecasts came to reality. Determine what factors affected forecast values.
- * Examine why transit/auto users make modal choices and the impact of quality of service on travel user decisions.
- * Examine the dynamics of peer review procedures in AA.
- * Conduct small area studies on transit's impact on land use impacts including the importance of complementary policies like land use controls and parking management.
- * Examine how Canada and Europe integrate transportation and land use planning.
- * Conduct an independent review of organizational issues associated with AA, design and construction.
- * Conduct before and after studies on costs and mitigation strategies.
- * Examine transit implications on urban design, e.g., the role technology plays in station location.
- * Develop a more formal information dissemination mechanism within UMTA.

- * Develop a joint process (with AASHTO, APTA, TRB, etc.) for developing research priorities.

- * Pool research dollars with EPA and FHWA to examine issues in air quality.

Industrywide Product Needs

In addition to these research projects, the participants recommended that the following activities be undertaken by UMTA, APTA, or some other appropriate group.

- * Develop a layperson's brochure on the AA process.

- * Develop a report that evaluates past AA practices.

- * Provide a list of project managers for projects in the 3 (j) report.

- * Develop a document that discusses strategies to educate the media (perhaps in conjunction with the first recommendation).

- * Develop a newsletter or circulate summary of newsletters developed by consultants.

- * Create an electronic bulletin board which focuses on national AA activity to help local officials better communicate and understand the AA process.

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The format of the workshop was developed to maximize the participants' opportunity to interact in small groups. The workshop was divided into five major sections. Four of these sections, those focussing on the structure of the planning process, the development of alternatives, financial analysis, and evaluation, were preceded by a plenary session that included three or four presentations from noted transportation professionals that were designed to highlight the key issues in that topic area. After the plenary session, the workshop was divided into breakout sessions where participants discussed specific questions that had been prepared beforehand by APTA's Subcommittee on Major Capital Investment and UMTA staff. At some point later in the workshop, the breakout session moderators reported back to the entire workshop and summarized the important observations, conclusions, and recommendations made by that

breakout group. The fifth session, future directions, was not preceded by a plenary session; rather participants met to discuss questions on future activities associated with the fixed guideway process and the roles of UMTA, APTA and the transit industry.

Over the 2 1/2 days of this workshop, the participants discussed a variety of topics and made numerous recommendations. These proceedings are organized in a format that parallels the structure of the workshop. The plenary presentations for each topic are presented, followed by a report of the breakout groups. The breakout session summaries are organized by the questions that were presented to the participants during the breakout session. Because of time limitations, every recommendation made in the breakout sessions and reported back to the workshop was not debated and discussed until consensus was reached. Where appropriate these proceedings provide some indication of the level of consensus that appeared to be associated with key issues.

The participants felt that the workshop was an excellent opportunity to discuss key issues associated with the fixed guideway planning process. There was unanimous acclaim to UMTA and APTA for organizing the workshop. Hopefully, these proceedings convey the sense of excitement and anticipation that participants felt at the end of the workshop.

OPENING REMARKS

**Julie Hoover, Vice President,
Parsons Brinckerhoff and
Chair, APTA Major Capital Investment
Planning Subcommittee**

It is with great pleasure that I extend to each of you a very warm welcome to the UMTA/APTA Fixed Guideway Planning Workshop.

I would like to start with some background information and explain how this workshop fits into an historic context. As you all know, UMTA's Major Urban Mass Transit Investment Policy of 1976 established the requirement for an "alternatives analysis" before there would be federal commitments for preliminary engineering and subsequent transit development. Around this time, two invitational conferences were held to solicit industry input into the alternatives analysis planning practice. These were the Hunt Valley and Airlie House conferences, in 1975 and 1976. In 1980, UMTA issued their first draft alternatives analysis guidance, describing generally how the AA/DEIS process should be conducted. Over the years, this guidance has been considerably expanded and refined--without benefit of widespread participant input. Privately, various members of the UMTA staff have lamented the absence of practitioner feedback, and they initiated several proposals to obtain it in a formal way. All were squelched, however, because the Administration's official position during most of the 80s was "no new starts." Thus, it was reasoned, there was no need for a conference dedicated to planning for new start projects.

Despite lack of federal encouragement, however, interest in fixed guideway projects grew considerably over the past decade and today there are more than 35 projects in the federal funding pipeline. Concurrently, the state-of-the-art of transportation planning has improved significantly, particularly in

forecasting but in other areas as well, and many of us are eager to share our experiences and ideas with both UMTA and our colleagues. UMTA staff are quite accessible and it has always been possible to communicate directly with them. (I have, for example, sent UMTA staff on a fairly regular basis batches of articles describing the advantages and benefits of various rail projects, and have received in the return mail a "thank you" accompanied by an equivalent amount of literature highlighting rail's shortcomings and pitfalls). Such exchanges cannot, of course substitute for the face-to-face in-depth dialogue about methodologies and planning practice all of us have wished for.

Exactly one year ago in June 1990, APTA responded to membership interest by creating a Major Capital Investment Planning Subcommittee of its Policy and Planning Committee. We polled our members and concluded a working conference on AA procedures was a top priority. In September, APTA Executive Vice President Jack Gilstrap wrote to Brian Clymer, the UMTA Administrator, proposing a jointly-sponsored gathering to explore the state-of-the-art in major capital investment planning. UMTA responded promptly with its enthusiastic endorsement, and we were off and running.

Our APTA Subcommittee again polled its members about the content and structure of such an event, and their input served as important guidance in developing the agenda.

Throughout the winter and spring, we've had numerous meetings and telephone consultations with the UMTA staff, and they have been consistently wonderfully cooperative. Because we all wanted this workshop to take place so very much, everyone was willing to compromise. Thus, for example, you can probably go down the list of break-out session

issues we've developed and guess with nearly 100 percent accuracy which issues were identified by APTA members, and which were contributed by UMTA. The point is, however, that everyone was inclined to give-and-take to make this joint workshop a reality.

Over the next two-and-a half days, we will grapple with five main topics: the overall structure of the transit development process, definition of alternatives, evaluation, finance, and future directions.

UMTA established several groundrules for the workshop which we accepted. The first was to refrain from officially recognizing policy issues in the agenda such as the "one corridor at a time" policy, but if such issues surface in the break-out sessions, they will not be suppressed.

Another UMTA request was to focus the discussion on their AA guidance, which we have done. Since some of the current reauthorization proposals tend to downplay alternatives analysis and feature instead intermodal planning at the regional (MPO) level, it does not seem inappropriate for us to devote some time in our discussions to what is simply good planning practice, regardless of the institutional context.

Finally, we agreed that we would not talk about funding levels--whether there is enough federal money for fixed guideway transit or too much--because this is something clearly beyond our control and there are many other forums devoted entirely to this topic.

Several people deserve special recognition for the success of this workshop. First and foremost are Brian Clymer and Jack Gilstrap, who agreed to co-sponsor this event and have supported it wholeheartedly. Within UMTA, Bob Stout and Don Emerson are the two individuals we have worked most closely with. Sam Zimmerman has also been extremely helpful and supportive, and it has been a very pleasant experience working

with all of them. Finally, you should know that UMTA has generously donated the funds to prepare formal proceedings of our workshop. These will be done by Mike Meyer, and I ask that you all help him by keeping legible, comprehensive notes of your break-out sessions.

On the APTA side, Brigid Hynes-Cherin was the co-chair with me of this event. She was unfailingly resourceful, wise, and a comfort. Steve Beard, Trip Brizell, Paul Bay, Tom Jenkins, and Ron Posthuma were also enormously helpful members of our planning committee. Bob Bachelder, Ed Gill, and many other APTA staff members provided invaluable support including all the logistical planning for this workshop. Finally, I want to thank the person who has worked the very hardest to make this event possible--Rich Weaver. Rich is the APTA staff person who had the misfortune to be assigned to our highly ambitious subcommittee and his consistent cheerful and positive attitude contributed greatly to the smooth working relationships that were maintained between UMTA, APTA staff, and APTA subcommittee members.

Next, I would like to use this opportunity to make a quick pitch for our subcommittee. We are a year old now, and have around 45 members. While this is our first event, we have a long list of proposed projects and we could use your help so if you are not a member but would like to be, just let Rich or me know.

We are all here because we share a strong common interest in transportation planning. Over the next two days, we will learn from each other as well as put forth our ideas for improving planning practice. While we are certain to disagree among ourselves and with UMTA on various issues, I urge us all to keep the tone of this event friendly and constructive. Hopefully we can make progress on some of the issues that have been bothering us, gain a broader understanding of all sides of the issues,

become better acquainted with our colleagues across the country and the UMTA staff, and have a little fun as well.

**Sam Zimmerman on Behalf of Hiram Walker,
Deputy Associate Administrator for Grants**

I would like to echo a few of Julie's words. Last year, Julie and I had an exchange at the APTA Rapid Transit Conference in Vancouver over a report that compared ridership and cost estimates with actual experience. I do not think we will ever agree on all of the issues aired in that debate, but we agree on the need to do a better job in transportation planning. This conference as a consequence emerged. It is something we used to do and look forward to seeing more of in the future.

I would like to thank a lot of people who made this workshop such a success. Julie Hoover, Brigid Hynes-Cherin, and Rich Weaver deserve a great deal of credit. In addition, both the National Association of Regional Councils and the American Association of State Highway and Transportation Officials worked hard to get people to attend.

I look forward to a very productive two days.

STRUCTURE OF THE PROCESS

**Remarks by Sam Zimmerman,
Director, Office of Planning,
Urban Mass Transportation Administration**

At the recent UMTA conference in Orlando, previous UMTA administrators were asked what they considered to be their major accomplishments in their tenure as Administrator. Nine administrators responded. One said his greatest accomplishment was thinking up the idea for a rational planning process, i.e., the alternatives analysis process. Another former administrator said his greatest accomplishment was strengthening the alternatives analysis process, including integrating into it the preparation of EIS's. A third administrator said his greatest accomplishment was rationalizing the UMTA New Starts decision process and strengthening Alternatives Analysis. I thought it was ironic that, although none of these administrators met beforehand, three of the nine thought the Alternatives Analysis process was good and took credit for it.

I came back from that conference with everyone talking about Reauthorization. There seem to be some common themes running through the Reauthorization debates. One theme is that we have to do a better job of planning -- easily said, but probably tough to accomplish. A second theme was that we need flexibility. We need to have decisions made by state and local decisionmakers where the problems are and where people know what the solutions should be.

When you talk to people about what better planning means, they tend to focus on the highway project development process. First, the facts are frequently not on the table when decisions are made. Often a highway investment decision is made before we know what the environmental impacts are, the costs and what

the benefits might be. The second thing is that the DEIS is often done after the decision is made to build a highway. The essence of NEPA, of course, is that the EIS should precede any such decision. The last thing is that the highway project development process in the past frequently did not consider options other than highways of the same kind. Sometimes, elevated versus at-grade alignments or four versus six lanes were considered, but transit people know there are a lot of options available to provide mobility and enhance the life of a region. If these are the things we need to improve in the highway planning process, what does this say about the one we use for transit?

Our process, the UMTA Alternatives Analysis process, does not suffer from any of these problems. I do not want to talk too much about our process, because I suspect most of you know a great deal about it. It begins with system planning (see Figure 1). System planning is not solely for the purpose of justifying going into Alternatives Analysis. Such planning is supposed to be undertaken, in cooperation with everyone, as part of the process outlined by the joint UMTA/FHWA planning regulations. Importantly, the process does not begin with Alternatives Analysis. Alternatives Analysis does not equal transportation planning. The Reauthorization will strengthen the system planning and programming process. We need to have these fully integrated with Alternatives Analysis.

The reason we are here is that this planning process was the result of learning from twenty years of experience. It was not put together arbitrarily to stop or delay projects. It was designed to be a rational way of putting information on the table of the quality, scope and breadth needed as the decisions were being made.

In my opinion, we do need to do several things better in Alternatives Analysis. First, we need to have better evaluation methods. We are all supportive of added Federal funding flexibility and of multimodal planning, but what are the evaluation measures reflective of equity and for quality of life? Do we know how to estimate them? I'm not sure we do.

Everyone talks about mobility as a goal, but how do you measure it? We did some work on these evaluation issues in the 1970's, but not much happened during the 1980's. When one focuses on multi-modal planning in the context of Alternatives Analysis, let's not focus just on transit. Let's do a good job for transit, but let's step back and maybe five to ten percent of the time worry about multimodal evaluation as well.

Secondly, we must do a better job of integrating financial planning with transportation planning. You run through the planning process, and then after it's all over you decide what to do and then determine financial implications; how will we fund our preference? I think financial issues should be considered sooner as an integral part of planning, not as an afterthought.

Third, we need better alternatives. If there is one area that always gives UMTA staff the most disquiet, it is that alternatives are frequently not representative of a full range of capital costs and a full range of modal capabilities as applied to the problem at hand. I don't want to take away the need for multimodal evaluation, but better specification of transit alternatives also deserves attention.

Fourth, how do we address the evaluation of what some people call the "soft" issues, e.g., impacts on quality of life and land use. If everyone in every EIS is allowed a very loose, qualitative chapter on such issues, will we be better off? Transit definitely has impacts that are difficult to measure. Nonetheless, we are making tradeoffs between money and other things. It would be very important for

decisionmakers to know what these tradeoffs are.

We must do a better job of evaluating these impacts beyond describing them with words, pluses or minuses, saying "good", "bad" or "indifferent".

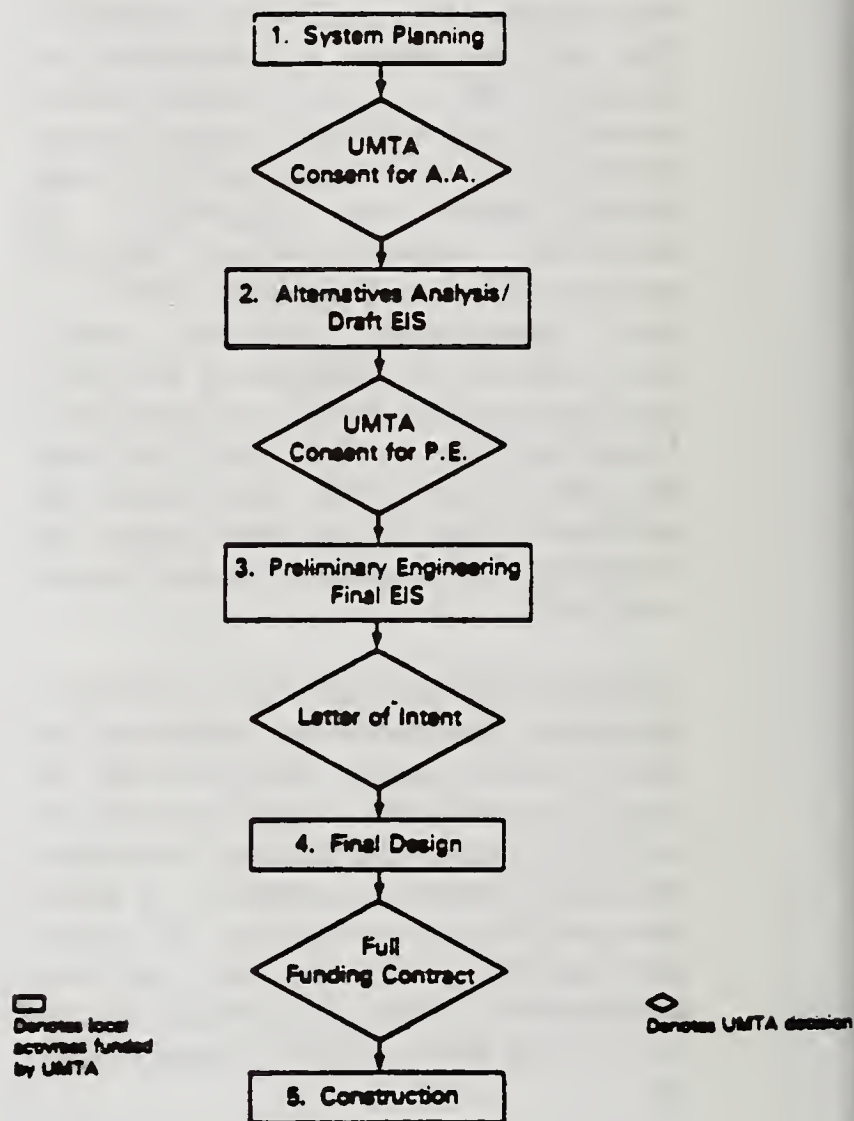


Figure 1-UMTA Fixed Guideway Planning Process

And last, we need to do a better job of technically managing the Alternatives Analysis process. The UMTA staff needs to do a better job, and local officials need to do a better job monitoring the local planning process. As we speak, UMTA is being investigated by the GAO on how long Alternatives Analyses take. Not surprisingly, the GAO is finding that they range from very quickly to longer. I do not think if you take a look at highway projects of similar nature, that they are moving any faster. How long has the project development process taken for the Century Freeway or the Central Artery?

In conclusion, then, the Alternatives Analysis process is not perfect. I do think there are improvements that can be made, yet I also feel it already serves a very useful and important purpose in supporting the decisionmaking that relates to rapid transit investments.

**Remarks by Ed Colby,
Director, Metro Dade Transit Agency**

My perspective comes from the role of a general manager. Sam mentioned several topics of interest, including multimodal transportation planning. I must say that we have never seen such planning.

Let me set the stage. In the early years of our country's development, the Federal Government was interested in completing the transcontinental railroads. They enlisted the help of the private sector but gave enormous amounts of land to the railroads in order to complete this needed project. Some of us in this room have purchased some of that right-of-way for transit purposes. The value has increased.

In 1956, some 35 years ago, the Interstate system came into being -- some 43,000 miles placed on a U.S. map. It was going to be all freeways -- Federal government standards -- with a 90% Federal share. Everything was

predetermined. It has taken 35 years, but the project is complete. Our urbanized areas contributed over two thirds of the gas tax money to complete the project, while getting back 19 percent. Did we talk about miles?

Now I come to public transit. Do I see a map? No. Do we see Federal interest? I hear over about overmatch and local matching ratios so maybe there is some Federal interest.

Now we are talking about multimodal planning and transit is in the spotlight. I hear people talking about system planning, thresholds, Alternative Analysis, the one-corridor rule, preliminary engineering, full funding agreements, design, construction and finally, operations and maintenance. The maintenance of the Interstate system is still at 80 or 90%. It was always going to be a system of freeways, not one transit line at a time as is the current Federal transit program. And unfortunately, it is a system is that we are lacking in our urban areas. I am glad to hear that Los Angeles is now building a transit system, just like they built a system of highways.

We come to this workshop to get inspiration, and answers/solutions to the problems facing those of us who are involved in the difficult art, science, politics and red tape of fixed guideway planning.

Miami, as many of you know, was involved in serious efforts to develop a truly multimodal, regional transit system in the 1980s and had not encountered a difficulty with the interpretation of the single corridor policy. We could be on our way to a true regional system serving a population that is now about two million people, plus a seasonal population that inflates that figure by some 200,000 additional residents during the winter months and now an additional influx from Cuba. All of this requires greater government services and facilities. Whether you like it or not, local governments are broke.

My comments are directed to the issue of the seeming compatibility of the UMTA and the local planning process leading to a "go-no go" decision, contrary to the Interstate where only the priority order was determined. It has been my perception that the process will work well if we recognize that the methodology sanctioned by UMTA should not be rigidly applied on a nationwide basis. By mandate, the UMTA process becomes the local process.

In terms of issues such as scoping, TSM, public involvement, and environmental concerns, UMTA must be prepared to give greater latitude to the strategies put forth by local agencies, as long as they result in legally advancing the process through these intermediate steps. In a project that also involves the FHWA, the two agencies must work together and not require the locals to complete two separate and distinct processes. I must tell you that the interpretation of the same regulations by FHWA and UMTA is different. And if you are going to build a busway project, you end up doing two processes.

It is not uncommon for the process to take just too much time from conception to construction. However, it did take 35 years to complete the Interstate. Alternatives Analysis needs to help move projects forward, not as a method of slowing the flow of federal dollars. A more flexible, closely coordinated effort between locals and UMTA seems to provide the best answer here. Flexibility, I think, is the key word. UMTA must be ready to react expeditiously at each review-and-approve intermediate milestone so that the bureaucratic process is speeded up. These inherent delays have dramatic effects on the potential "buying power" of local transit agencies. The Papago Freeway in Phoenix supposedly cost \$2 million a day for every day delayed.

I am sure UMTA needs additional staff to do this. If that is the case, then let it be not all in Washington. Perhaps more of the AA work

needs to be approved in the regions.

On our side, local agencies must be responsible to adopt work plans that meet the spirit as well as the letter of the Federal guidelines and, when overseeing the work of consultants, make sure that schedules and deliverables are adhered to faithfully.

I would like to address next the issue of how to improve the earlier system planning process, and the integration of transportation/land use/air quality planning. To me, at the local level, this means only one thing, pay attention to your 3-C process, and make sure that this process sets the proper foundation for quickly advancing objectives to the next step, i.e., Alternatives Analysis. I believe the system planning process must provide additional analysis in order that a corridor can be readily selected for AA. For many MPO's, however, a transit alternative is an afterthought.

Dade County, luckily, is a charter county having clear responsibility for ground transportation planning activities. No jurisdictional or territorial imperatives are recognized except the power of the county to plan for and implement these plans. This includes power over land uses in the unincorporated areas, and air quality on a countywide basis. In addition, we have had an established and long standing public participation process that has received national recognition. Citizens are involved early in the process, from examining alignment alternatives to vehicle technology, station location, and even the naming of stations.

The coordination with other local appropriate agencies has also been exemplary, and it has included much more than nominal participation by the various cities served by our system. (Miami, Hialeah, Coral Gables, and South Miami). This kind of commitment and strategy we believe is necessary for system planning to be meaningful.

Let me address next another point that deals more with the contents of the process than the process itself, but that nonetheless tends to affect how the information flows and the duration of the efforts. Are UMTA's guidelines too prescriptive when it comes to the AA methodology? I believe the guidelines need to be addressed, but I also believe the indices and thresholds need to be taken as part of, but not the only evidence for, the justification of transit alternatives. Here again, UMTA and the local agency must interact closely to hopefully reach consensus whenever the methodology fails to provide a neat answer, or where the differences in the indices are so insignificant that choosing one alternative over another needs to be driven by non-quantitative considerations. The process should not be used in such a rigid fashion that it may stifle the qualitative dimension of major capital investments.

The local agency must interact to get consensus. It is very difficult to get UMTA approval when you do not have consensus at home. You can have three or four of your city councilors visit UMTA and say "this is what we want to do", only followed a week later by others saying "this is not what we want to do". You always have to remember that transit lives in a media fishbowl. Everyone tries to help us.

Still another concern deals with the merits of turnkey projects in which not only design and construction is left to the contractor but which, like in Houston and Honolulu, include the responsibility to operate. We did the original Metromover project in Miami under a turnkey arrangement, although not including the operation of the system. And while we recognize the merits of these arrangements, we feel our experience had both positive and negative aspects. That is why, in the People Mover extensions, we have retained control of the construction management activities. A turnkey project, in our case, would have required a sole source contract in excess of \$200 million.

No doubt turnkey projects simplify a number of aspects of project development and implementation but, at the same time, a great measure of field control is lost to the contractor. We believe this price is just too high to pay for the benefits accrued. I am sure Houston and Honolulu will have a lot to share with the rest of us once these projects are up and running. Turnkey projects will trade old headaches for new headaches.

On the issue of the Overmatch Initiative, and how this has affected local decision-making, I can see how this single item could develop into the prime mover determining which transit project to underwrite. This could lead to the classic "haves" versus the "have nots". What happens to highly cost-effective and technically sound projects in areas where the additional dollars from either the state or the locals, or even the private sector, are hard to come by? This was not the case with the Interstate. I suspect it may be worthwhile to explore integrating the cost-effectiveness and local financial effort evaluation process so that a highly cost-effective project with a minimum-requirement match may get equal footing with a lesser cost-effective, but higher overmatch project. This could result in a more equitable evaluation of the merits of projects being considered.

One of the problems with cost effectiveness in AA is that you measure cost effectiveness of your project against the TSM alternative. In the past, the TSM alternative has kept getting larger and larger, with a resulting decline in cost effectiveness. A TSM project should be a feasible project unto itself. Would the locale truly do that project? If the answer is "no", then it should not be the TSM project. TSM alternatives can also be difficult to sell politically.

Remember that a lot of imponderables can, and do get, into this picture as the clock continues to click. Time is money. Ultimately these

decisions are politicized anyway.

And finally, how can existing institutional arrangements dealing with Federal, multi-agency participation be improved? I can tell you that better coordination sounds great, but it is a two-way street. Locals must work together, as well as with the Federal agencies. My experience in Denver was that initially UMTA and the FHWA never could agree on how to proceed, so we locals had to do additional work, two separate processes, to avoid undue delays that would have further erode our ability to implement important projects. Then when the work was done, FHWA changed their mind and placed a hold on the project due to new highway requirements.

Transit dollars should not be used to rebuild freeways that are of inadequate designs. When highway dollars are involved, design criteria should not always be so strict.

From my viewpoint, it appears these problems cannot be addressed appropriately until we all decide to embrace the spirit of the new national transportation policy as expressed by Secretary Skinner, and we begin to take seriously the concept of the transportation partnerships that gives local and state governments the flexibility, the responsibility and the tools to respond to the challenges of our constituents as well as to the Federal government.

**Remarks by Paul Bay,
Vice President, BRW, Inc.**

I need to state at the outset that my personal opinion is that the Alternatives Analysis process really is a good one. It asks us to do what we ought to do anyway. It marries the requirements of NEPA to look at alternatives with engineering economy. It ensures that the decisions are made after you've really looked at the alternatives and the decisionmakers have the results in front of them, and it promotes using good fiscal sense.

However, having said this, I do believe the process has some problems. In particular, there are four problems which affect how good the process is. The ability to do something about these problems is a challenge for all of us. They cannot be addressed solely by UMTA, nor by the transit industry alone.

The first problem is the method of funding major transit projects. It is associated with the discrepancies between forecast and actual estimates as reported by the Pickrell report. I believe that one of the major problems we have with the AA process is driven by the fact that the funding base is competitive, project-by-project. Highways have pipeline funding. The money is in the pipeline and projects are selected to take advantage of the money available.

For transit, each project must be looked at individually and compared to other projects not only in the region, but nationwide. They must compete for funding. In this environment, we are told that a project needs to be high on the competitive scale, that one needs to have a good cost effectiveness index. This, in turn, means ridership should be up and costs should be down. How do you think we will make our estimates? There is always a range of estimates for ridership and for capital costs. When we send the information to UMTA, are we going to send the low end figures for ridership and the high end estimates for costs? Not likely. The result is what Doug Wentworth has referred to as "compounded optimism" which results in the problems laid out by Pickrell in his report. It is still a problem and as long as the funding is structured as it is, it will likely continue to be a problem.

The second problem is that few understand the UMTA process. We do a lousy job of explaining to our policy makers, those who think they are in charge of the decision, that there is a process that must be followed. And when we do explain it, we explain it as a Federal requirement that must be met, not as a valid process meant to result in better decisions. We

never talk about why it is important to look at alternatives, why it is important to look at cost effectiveness, why it is important to look at financial capability, and why it is important to look at these other things related to ridership. We do not tell them that the process will take time. In fact, we tend to downplay the process with local officials, with the result that they do not understand it, the public doesn't understand it, and they all get frustrated because it takes longer than expected and often results in tasks being undertaken more than once. The fact is the process is not understood generally at the local level where it must be played out. As long as it is not understood, we will continue to have problems with Alternatives Analysis.

The third problem is the lack of coordination with FHWA and with the other agencies involved with urban development. What about all of the non-transportation infrastructure costs associated with a project? How do we link transportation and land use? How do we plan and implement projects so that there is a rational convergence of our highway plans, our transit plans, our growth management plans, and our air quality plans? I have had the pleasure, in two different regions, of introducing the Regional FHWA Administrator to the Regional UMTA Administrator. They had never previously met. This is just a symptom. If we really mean the 3C planning process and really want good system planning, it has to be more than an UMTA process. If we really want multimodal Alternatives Analysis, we have to bring FHWA into the process.

The final problem is the concern about a corridor-by-corridor approach to planning. You may find the "best" alternative for the corridor, but it might not make the best sense in a regional context. How do you make sure that what you are doing in one corridor really fits what needs to be done in other corridors? The example that best illustrates this dilemma is Seattle where there is a downtown bus tunnel which can be converted to rail. Approaching the

process at one corridor at a time, if you decide to put a busway in one corridor and rail in another, what does that do to the operation of the tunnel? This is only one example. I understand the reason UMTA has a one-corridor-at-a-time policy. I do not think those reasons are compelling enough to answer the problem of how to avoid suboptimization of the system.

Let me end by saying that these are problems we have to address. We, all of us, must solve them. There are others dealing with the technical aspects of the planning process, but with regard to the overall structure of the process, these are the most important.

Remarks by Michael D. Meyer, Professor, Georgia Institute of Technology

The transportation profession is today facing an important opportunity to re-examine transportation planning and its relationship to a series of other issues like air quality, economic development, land use, and congestion management. The Clean Air Act amendments of 1990 and the likely reauthorization of the surface transportation program will provide new challenges and opportunities to the ways we conduct planning and develop our transportation systems.

There are two important characteristics of the public transit decisionmaking environment that should guide the development of recommendations from this workshop and, for that matter, that should influence changes to transportation planning in general. The first is that decisions are made by local officials, which implies that decisions will be influenced by local politics. We do not need any further scholarly reports that, after examining decisionmaking at the local level, conclude that the decision was based on economic development reasons, or that the business community played an important role in the outcome of the decision process. We

have known this for many years. The question now becomes, how do we accept this environment and develop a process that informs the decisions made within this environment?

The second characteristic, and one becoming even more important, is that the externalities of transportation (i.e., air quality, noise and economic development impact) are rapidly becoming the most important driving forces behind transportation planning. Decisions regarding transportation investments must be made in the context of the impact this investment will have on such concerns. The obvious example is air quality. The U.S. DOT and EPA have recently issued Draft Interim Conformity Guidance which will greatly influence how transportation planning will occur.

Additionally, many are now arguing that we need to reexamine our institutional arrangements to see how EPA, FHWA and others can be brought more strongly into the planning process. I assure you that EPA will be a major actor in many areas through the SIP process and through a determination of transportation plan conformance with the SIP. EPA could become a major force influencing the scope, direction, and products of the transportation planning process.

What do these two characteristics say about fixed guideway planning? Most of you are familiar with the existing "3C" transportation planning process. I will now offer a modification of this traditional process. I will argue that the above characteristics imply a "4C" process. Fixed guideway planning should be a process that is credible, consistent, cooperative, and resulting in cost-effective decisions. These four characteristics are critical to a successful fixed guideway planning process and to what the products of that process should be.

Credibility -- Credibility, with whom? Certainly with authorizing bodies like state legislatures, with the public, with oversight agencies, and

increasingly these days with the media. I often receive calls from reporters around the country asking me to comment on some aspect of a local transit planning process. The media is playing a very important role in the decisionmaking process by influencing public opinion. This relates to Paul Bay's earlier comments about the need to better understand the process. Credibility in the process not only relates to the cost and ridership estimates, but at its very basis, requires an understanding of what that process is.

How does one establish credibility in a planning process? There are several strategies that should be considered for establishing credibility. A good beginning is in making sure that local officials and the public understand what the process is, what it should accomplish, and when. This often requires extensive public meetings in the initial study stages and continuous public involvement throughout the planning effort.

Developing more sophisticated models and analytical techniques will also provide greater confidence in the study results.

I personally feel that, if done correctly, a peer review or expert review process is a very good way of providing credibility to a process in terms of assuring the local decisionmakers that the assumptions, methodologies, and the approaches used in the study are about as good as you are going to get. Such credibility in the process is important so that when the local debate begins on what is the appropriate decision, the debate will not be sidetracked on issues of whether a wrong model or a bad assumption was used in the analysis. I would strongly recommend that the creation of an outside expert review panel be a formal requirement of the Alternatives Analysis process, not as a decisionmaking body, but as an advisory one.

Consistency: By consistency, I mean consistency over time in forecasts and in the assumptions and data that serve as the basis for

evaluation, as well as methodological consistency from one part of a metropolitan area to another. In addition, consistency is important when one relates your planning outputs to other planning efforts. If you remember Sam Zimmerman's flowchart, the first element of the fixed guideway planning process is system planning. Although I think UMTA's fixed guideway planning process is, in general, a good process, there seems to be some inconsistency between applying the different steps in the process. Certainly, this is true with system planning which I consider to be the weak link in the entire framework, at least as applied in most urban areas. All too often, Alternatives Analysis becomes the system planning component of the process. This is a real problem. And increasingly this is going to become even more of a problem when we get into issues like air quality planning, congestion management plans or land use/growth management which must be viewed at a regional level. Conformity determinations between these issues and transportation plans will, in my opinion, force the regional system planning perspective to become ever more important.

As one of the background papers has cautioned, however, we must be careful that these system plans do not "take on a life of their own". Such plans can ignore some of the changes that have occurred or will likely occur between the date of plan acceptance and the planned target year. Flexibility in the system planning process is critical.

One, potentially very important, aspect of the need for consistency in planning will be an increasing emphasis on multimodal planning. Many of us do not know what this really means. We do not know what multimodal evaluation entails, nor what criteria are likely to be used. This is an area that needs to be explored.

There is an opportunity that might be available in the future to place more attention on multimodal planning. It is likely that the

reauthorized surface transportation program will increase the amount of PL funds that will be available to the MPO's. If such is the case, I would recommend that the FHWA and UMTA develop guidance on the type of multimodal and system planning that should be undertaken with some of these funds.

Cooperation: Previous speakers have spoken about the need to have many different agencies and private sector participants involved in the fixed guideway planning process. I view the cooperative nature of fixed guideway planning as being primarily important from a funding point of view. We recently completed a project which examined UMTA's Overmatch Initiative and local financial planning for transit project analysis. We concluded that many properties do not look beyond the capital cost years of the investments they are considering, and thus ignore potentially significant operations and maintenance costs that may occur once the system is in place. I agree with Sam that there needs to be a better integration of the financial planning aspects of major fixed guideway planning with the decisionmaking process. Cooperation among state and local jurisdictions, and with the private sector, will be critical in developing a successful financing strategy that will support the new facility or system long after it is constructed.

Cost effective: The final characteristic relates to the product of the Alternatives Analysis process -- that being the selection of the most cost effective alternative. Of course, questions remain on how you determine cost effectiveness. The activities that I have been involved with, both in Massachusetts and around the country, clearly indicate that some attention is given to costs, little attention is paid to many of the effectiveness criteria, and most of the local decisionmaking revolves around asserted economic development benefits, perceived air quality/energy impacts, and perceptions of city image. Yes, ridership is important. But local officials seem to place greater weight on issues

that, in their mind, will substantially (i.e., physically) alter their city. It is not clear what these impacts will be. This workshop should clearly examine these types of issues. I would also strongly suggest that UMTA develop guidance on how these issues should be considered in the AA process. These issues also affect the type of evaluation methodology that is used in providing the information for decisionmakers.

In summary, if one can develop a fixed guideway planning process that incorporates credibility, provides consistency, has cooperation from all affected actors in developing an accepted funding package, and results in cost effective strategies, then you have gone a long way toward developing a process that will have a tremendous impact at the local level.

PROJECT PLANNING PROCESS BREAKOUT SESSION

"There's never time to do it right, but always time to do it over"

The purpose of any systems or project planning is to provide the information necessary to decisionmakers so that investment choices can be made with full knowledge of the likely consequences of these decisions. The UMTA Alternatives Analysis process is one of the more structured planning approaches for public sector decisionmaking. The breakout sessions discussed many characteristics of this process and made several recommendations to improve it.

What should be done to improve the 3-C system planning process?

The initial phase of the fixed guideway planning process is systems planning. This is the phase that is most often overlooked and the weakest in the planning for fixed guideways investments. It is perceived by some to be something different from the normal 3C transportation planning process. Some participants felt that the system planning element should evolve from a process that one goes through to pick a priority corridor to an on-going process that produces data useful for programming projects on a multimodal basis. It should be technically sound and politically relevant. Each urban area needs a process that works locally given different institutional, historical and political arrangements. To some extent, system planning should be considered a "visioning" exercise, an activity that allows local officials to describe what they want in the future.

Technically, the systems planning element should be the step where ridership models are developed. If there will be additional planning funds in the future, UMTA should give some consideration to providing a discretionary program for developing cost effective methods,

models, and data bases. The federal emphasis should be on a good technical process, not focussed on organizational issues. In addition, there should be on-going research on socio-demographic trends, e.g., workers/household, that may have significant impacts on travel patterns.

Multimodal planning should be encouraged at the regional level. Some areas, like California, already have more flexible regional funding sources that can allow local planners to look at highway/TSM/transit tradeoffs. There is a concern that there are insufficient tools and a definite bias toward highways in current planning procedures, matching ratios, and administrative guidance. Flexible funding is necessary to make multi-modal systems planning effective. It is important that UMTA and FHWA work together to develop joint guidance on multimodal planning.

Is the current UMTA Guidance on Alternatives Analysis too prescriptive?

Generally, the workshop participants felt that the Guidance document provided a good level of detail to local planners. The Guidance has helped to define the federal fixed guideway investment process, while providing some flexibility for local interpretations. Most participants felt that the Guidance provided helpful detail in the areas of ridership forecasting, cost estimation, and cost effectiveness. However, the section on definition of alternatives, especially the description relating to the TSM alternative, was troublesome.

There was a broad consensus that the UMTA process should allow local planners/officials to

skip steps in the process if the decisions are clear and sufficient technical justification exists with which UMTA concurs. For example, some suggested that an area could go from systems planning to preliminary engineering/FEIS if sufficient prior work existed that justified such a step. Similarly, there is the need for flexibility to vary or change alternatives at various points in the process or to remove alternatives. These suggestions were mainly motivated by a desire to reduce the amount of time spent in planning for fixed guideway investments.

There was a difference of opinion on the value of additional material in the Guidance document. Some felt that additional material (e.g., chapters) were necessary on the topics of system planning, preliminary engineering, and final EIS. Others felt, however, that new Guidance materials in these areas would become too prescriptive. For these participants, it was important for UMTA to reiterate what it expected as outcomes from each stage in the planning process so that there would be no "surprises".

How compatible is the UMTA process with local processes?

There are inherent differences between UMTA's planning process and local decisionmaking. UMTA's process tends to be methods-oriented, technically proficient and occurring in a stepwise manner. The local decision process is often less technical and fragmented institutionally. However, the UMTA process does offer something positive to the local process if it leads to the rejection of alternatives that should be rejected, but will be perceived as negative if it does nothing more than stall project selection.

Integration of the technical planning process, especially the technical reports, into the local decision process has not been very successful. The lengthy UMTA review and response has added to the difficulty with local decisions, resulting in some cases in local apathy to UMTA

requirements. In addition, some felt that UMTA has required some transit agencies to redesign TSM alternatives in a manner that was incompatible with local conditions and land use policies.

The UMTA Guidance and policy should be more in tune with the local decisionmaking process. This means that there should be more flexibility incorporated into the process.

There was general agreement that the UMTA Alternatives Analysis process is perceived as a mystery to many local officials. The general public and the media do not understand the process. These groups very quickly lose interest in the process. It is very important that a pamphlet/brochure be produced by UMTA or APTA which could serve as a layperson's guide to the process.

What should be done to better integrate transportation, land use and air quality planning?

The evaluation criteria for Alternatives Analysis are based on the cost effectiveness concept. Several workshop participants felt that the guidelines should be revised to give some credit for local land use policies and programs that are supportive of transit planning. Some felt this should be done in the system planning process, others recommended that it should be carried through the AA process. There is some concern that the technical process for counting land use benefits be done so that there is not double counting. For example, special benefit assessment districts would be considered and counted in the financial evaluation process. A method for providing credit to those areas that have implemented supportive land use policies should be developed. At the very least, UMTA should clarify the role of land use policies in the AA process. The Clean Air Act and the likely planning provisions in the new transportation law make it imperative that the land use/transportation linkage be examined seriously.

Are UMTA's reviews and approvals made in a timely manner?

There is little question that UMTA needs to have some process for evaluating and comparing investment proposals. The workshop participants, however, made several observations about this process and recommended some changes.

There is a need to judge consistency of results from one city to another, but judgement needs to be used in this comparison that takes into account local circumstances. A \$10 per ride criterion presumably will mean different things in different cities because of the variation of alternatives definition, socio-economic assumptions, etc.

The UMTA thresholds of \$6 per new rider and \$10 per new rider should be updated. Because of changes in value of time, a project that met the \$10 threshold in 1984 today would in today's dollars have to meet a \$12 threshold. Some consideration should thus be given to updating these values.

The cost effectiveness index causes problems as well. Workshop participants felt strongly that decisions should not rely on a single index. There is a need to incorporate unquantifiable considerations into the decisionmaking process, for example, supportive land use policies.

There needs to be a better relationship between UMTA's regional offices and headquarters. The headquarters staff seems to have technical expertise while the region's have close proximity. Assessment of the AA process seemed to vary by the ability of proponents to tie into UMTA staff in headquarters. In addition, there needs to be better coordination between FHWA and UMTA, and more likely in the future, with EPA.

Participants felt that UMTA should promote its process better. As part of this, UMTA should

be the one to encourage locals to examine a wide range of alternatives early in the process, because local planners are not often in a position to ask for this. The exception to this, of course, was in those situations where the most likely selected technology was known beforehand (e.g., an extension of a fixed rail line).

Given the previous comments on flexibility, it was not surprising that many participants argued that UMTA should streamline the technical process, especially reducing the need for documentation. This streamlining could also be accomplished by combining steps.

There was broad consensus that more staff was needed if UMTA was serious about overseeing an effective Alternatives Analysis process. In particular, the recommendation for additional staff was often justified on the need to provide consistency from one review to the next.

Are AA's taking too long?

The feeling among the participants was that the AA process was taking too long, although there did not seem to be any data to support this observation. It was suggested that perhaps UMTA could collect data on this question to see if, in fact, the AA process is taking a long time. Three suggestions were made to expedite the AA process. First, it is important to do a better job in systems planning. Take care of as many of the policy issues as is possible in this phase. Second, spend some time on preparing good, quality data. Are the models ready? Have the methods been approved by UMTA? Third, provide a better definition of the process to local decisionmakers so that they know what to expect. In general, the planning process required by UMTA is similar to that followed by private sector organizations that are facing large investment decisions, and thus on this criterion alone, seems like a reasonable process.

How to speed up the process? Certainly, one of the means of speeding up the fixed guideway

planning process is to undertake some preliminary engineering activity early in the process. The AA guidelines give local officials today the ability to undertake preliminary engineering in the AA process. The question is how much PE makes sense? The earlier in the process that one does PE, the more costly it could be in that PE would have to be done for all alternatives under consideration. However, the participants agreed that earlier PE work is a good way of reducing delay. It was suggested that consultant RFP's should include in them a statement on how much PE is expected on the job.

What has been the experience with transitional AA's?

Most participants felt that transitional AA's were useful and should be continued because system planning, as currently defined, can not give you the necessary level of detail required.

What are the challenges and limitations of using turnkey contractors?

The workshop agreed that there is sufficient flexibility in federal procedures to allow turnkey projects. However, a better understanding of contractual and procurement requirements is required. The participants made several observations about turnkey projects that merit special attention. First, local laws will influence what agencies can do. In some cases, turnkey projects will be allowed as a single unit, whereas in others the overall project might have to be subdivided into separate components (e.g., stations bid separately). Second, it is not likely that turnkey projects will reduce the need for agency staff commitment. Third, the longer you can require operations/maintenance costs to be covered the better. Finally, go into the negotiations with your eyes open and with careful consideration on how this project will affect the stability of your budget over the long term.

The participants identified the following perceived benefits and problems associated with turnkey projects. They readily admitted that there is no conclusive evidence at this time to verify or refute this list.

Perceived Benefits

- Lower cost for project
- Look at a variety of technologies
- Opportunity to control costs and shift risk to private sector
- Brings contractors experienced in joint development
- Sticker shock will come earlier in the process
- Interface between contractors reduced
- Independent validation of cost and schedule
- Gauging expertise of contractor in application
- Contractor may bring new ideas to the project

Problems

- Unclear about cost reductions
- Possible changes to project late in process that causes contractual problems
- Quality control
- Contracting/document control needs to be firm

There was a clear need for further communication and interaction on this issue among those agencies involved with such projects.

ALTERNATIVES DEFINITION

Remarks by Donald J. Emerson, Office of Planning, UMTA

The alternatives definition step of Alternatives Analysis is perhaps the most critical step in the process. A couple of years ago when UMTA was facing serious staffing constraints, the AA staff was asked "if there was only one part of the Alternatives Analysis process that you would want to stay involved in, what would it be?" To a person, the UMTA staff agreed that we would want to review the definition of alternatives. Alternatives definition is important in everything we do in the AA process, in system planning, in preliminary engineering. For, if the alternatives are not properly specified, the analysis and evaluation will be faulty as well, even if proper analysis techniques are employed.

While alternatives definition is critical in each phase of the process, the kinds of alternatives and particularly the level of detail will change as projects proceed through the phases. In system planning, local governments might be comparing alternative corridors and trying to identify the most attractive mode and alignment options. In Alternatives Analysis, of course, local agencies do detailed assessments of the most promising mode and alignment options, leading to decisions on the preferred mode and general alignment. In preliminary engineering, local sponsors might look at design options such as station locations, final alignment, etc.

Chapter II in UMTA's Project Planning Guidance presents ideas that can be applied to the definition of alternatives in each phase of the process. Indeed, our Guidance document might provide useful thoughts on alternatives definition for highway planning, multimodal planning and other transit planning processes.

The Guidance does not prescribe the specific alternatives one needs to look at, e.g., light rail,

busways, peplemovers, etc. The alternatives definition chapter lays out principles that should guide the selection of alternatives to be studied. These principles include:

- o Studies should include all the baseline alternatives: the no-build alternative for environmental purposes, and the TSM alternative for evaluation purposes. The TSM alternative should also be viewed as a real alternative that works within the corridor.
- o The set should include all reasonable mode and alignment alternatives, but only those that are reasonable.
- o The set should include alternatives that address different goals and objectives.
- o The set of alternatives should include all alternatives that have a chance of becoming the preferred alternative.
- o There should be no major cost gaps in the set of alternatives. If one has a low cost alternative and a high cost alternative, there will often be something in between.
- o There should be fallback options. Those options that are initially thought to be the most desirable may drop out of consideration later in the process. One needs to have a fallback position.
- o The number of alternatives should be kept manageable. If too many alternatives are advanced, local staff and decisionmakers can easily become so overwhelmed with information that they have difficulty making a thoughtful choice.

There are six principles that are used in defining individual alternatives.

- o The alternatives should respond to the transportation problems in the corridor. This may seem obvious, and yet many studies struggle to clearly define problems and potential solutions. We view AA as a problem-solving exercise.
- o The operating plan for each alternative needs to be optimized so that each technology is presented in the best light.
- o There should be a consistent policy setting (fares, land use, etc.) for each alternative.
- o The alternatives should be defined in all dimensions: operating plans, institutional setting, financial strategies. All of these are inherent characteristics of the alternatives that will determine how well an alternative will perform.
- o Environmental considerations should be considered from the start.
- o The alternatives should be significantly different from each other, not mere design variations. Whether an alternative is on one side of the street or the other is not really important during Alternatives Analysis. Engineering issues should be put off to the preliminary engineering phase.

UMTA's Guidance then goes on to talk about particular issues -- the no-build alternative, the TSM alternative, guideway alternatives, highway alternatives in a multimodal context and what highway network assumptions need to be made. Hopefully, most of you are familiar with the detail found in this chapter of the guidance.

Let me discuss two of these principles more thoroughly because we seem to wrestle with them case after case, and there may be some confusion. The first one is consistency. The guidance talks about consistency in assumptions about land use setting, loading standards, coverage, fare policy. The purpose of the

analysis, after all, is to determine what is different between alternatives. We need to know how much one alternative costs compared to another, how much better it is in terms of transportation service and environmental impacts. To isolate those differences, the analysis must be based upon consistent assumptions. It should start with a level playing field with regard to these policy assumptions.

It is not always obvious what these assumptions should be. One of the issues that often comes up is the need for consistent policy toward standees. A basic precept in UMTA's Guidance is that, if rail vehicles are allowed to have standees, then they should be allowed on buses, providing the buses provide a similar type of service. If express buses have everybody seated, then it is not fair to compare this with a light rail line where riders are allowed to stand in densely packed conditions. Translating this into a real world setting is sometimes difficult.

The second principle is optimality. By optimality we mean that the operating plan for each alternative should be optimized, recognizing that each technology has its own inherent strengths and limitations. A TSM alternative may be low in cost, but require that many of the buses operate in mixed traffic. A rail alternative may have the advantages of higher speeds and higher capacity depending on the corridor. The limitation of rail is that the vehicles are confined to the guideway, necessitating more transfers from feeder buses to rail. A busway can provide ample capacity, relatively high speed, and flexibility in terms of operating plans, but it might require more vehicles, drivers, and land than a rail alternative. Each alternative's technology has its own inherent limitations and advantages that need to be considered in developing the "best" representation of that alternative under the given conditions.

Sometimes local staff will come to us with a busway alternative that operates just like a light

rail line, with on-line stations and buses that are confined to the busway. They contend that they have designed the busway this way for the sake of consistency: buses cannot leave the busway because a light rail train cannot leave the tracks. Planners should not confuse consist input assumptions with the need to optimize a given technology within the constraints imposed by that technology.

In summary, alternatives definition is a critical aspect of the alternatives analysis process. Extra time spent in defining the alternatives according to these principles can lead to a sound technical analysis of each alternative's costs and benefits.

**Remarks by Greg Benz, Vice President,
Parsons Brinckerhoff**

Alternatives definition is the driving force in the Alternatives Analysis process. The UMTA Guidance is really quite good in describing how alternatives should be defined. While previous speakers have discussed the importance of the detailed definition of alternatives, I think the conceptual definition of the alternatives is the most crucial part of the process. Because without careful attention to conceptual definition of alternatives, you can end up with transit solutions in search of a problem. When you have a transportation problem or need you are trying to solve, the alternatives should be defined to specifically address this need. You should first ask, what service improvements are needed to address these needs and problems? By so doing in the conceptual definition of alternatives step, you are focusing on the types of service that can be considered, not on the characteristics of specific technologies. These service characteristics, of course, lead into an eventual discussion of specific technologies in the detailed definition step. But by focussing on service planning early in the process, you are optimizing the nature of technologies that can be considered later. The Guidance does not emphasize the importance of service planning

during the conceptual definition of alternatives, and I think it should.

The Guidance really is quite comprehensive in the types of issues that should be considered throughout the process. There are clearly issues that should be put to rest during system planning and others that should await preliminary engineering. The Guidance should address the issue of when during the various parts of the process that the appropriate issues are best addressed. If you try to address too many issues at any particular point, you run the risk of getting bogged down.

One area where the Guidance could be improved is by developing materials on operations planning for the alternative. There is a whole chapter on operations and maintenance cost estimating and a chapter on demand forecasting. Operations planning drives the service planning for the alternatives definition. It also has an important linkage to the O&M cost estimation and patronage forecasting processes, particularly when you are analyzing what I call the medium-range alternatives--options like busways and light rail transit. These types of transit technologies have a tremendous range of flexibility in trading off service and the capital intensity of the alternatives. Taking advantage of the flexibility that these types of options have requires you to be specific about the operational strategies to be used.

The no-build alternative should be a fairly straight-forward definition, although the Guidance offers several versions. One definition of this alternative is that it should include only those components that are existing or committed, i.e., those for which funding/implementation is virtually assured. This is conservative from an environmental standpoint, but it has its pitfalls. One is that if you exclude the roadways from your future street no-build network that are expected, but not yet funded, this can result in totally unrealistic trip assignments which could result in V/C ratios on highways in the 4.0's to

5.0's. (It can make the transit alternative look better). How do you deal with this in any rational manner? In particular in high growth corridors, it seems appropriate to put in roads that are likely to be in place. Of course, showing such roads on a map runs the risk of upsetting local officials and others who have not agreed to these roads or facilities.

The TSM alternative is probably the most misunderstood alternative. UMTA has several objectives that are to be accomplished by the TSM alternative. The primary objective of TSM is to maximize people movement. Ironically, this objective could penalize a fixed guideway project or corridor in that a good TSM alternative would show a smaller incremental change in new riders, a primary measure of benefit in an Alternatives Analysis. Another issue associated with the TSM alternative is making local officials understand why it is used as the baseline for evaluation. We should be debating at this workshop if it is the appropriate baseline for evaluation, or would the no-build alternative be a better reference?

For the fixed guideway alternatives, one of the areas that needs further discussion in the Guidance is that the definition of fixed guideway alternatives often changes as one proceeds through the process. A change to the definition of fixed guideway alternatives is one of the reasons for the dramatic capital cost increases of transit projects that have been the subject of recent studies. The Guidance should point this out and strongly suggest that any changes to alternatives definition be made as a conscious decision with full awareness of the cost implications and service impacts.

My final point is in regard to the role of advanced technology in alternatives definition. There is a whole host of advanced technologies that vary in guideway support systems, propulsion systems, and control systems. The time to deal with these differences in the Alternatives Analysis process is unclear. They

may not so much be an issue in transportation performance evaluation because you can deal with this through performance specifications. However, there can be issues in environmental impact statements where the noise characteristics and property impacts of these new technologies need to be addressed.

Remarks by Ken Goon, Director of Planning, Maryland Mass Transit Administration

I would like to begin by stating the charge to the speakers. I was asked to provide a transit operators' perspective on the alternatives definition process. My thoughts differ a bit from what you've heard from the previous two speakers. UMTA feels that the Alternatives Analysis process is one of providing good information so that decisions can be made, both at the local and federal levels. Consultants are very effective at knowing exactly what UMTA wants, what has to be done to deliver a high quality deliverable to UMTA. The consultant perspective, although focussed on a specific project, is geared to an UMTA audience. The transit operator's perspective is twofold. First, we have to satisfy the UMTA requirements. Second, we have to deal with our own operating entities and with the public, the public defined as community groups, businesses, elected officials, etc. My comments this morning will relate to the second perspective, that is, the local public perspective.

Let me first discuss the issue of number of alternatives. I have been involved in five Alternatives Analyses over the past ten years. These studies have ranged from two or three alternatives to eight. Our experience has been that eight alternatives is the maximum number of alternatives you should consider, even though the Guidance says eight to ten. Even in the corridor which considered eight alternatives, we tried to reduce the number of alternatives that we had to carry through the environmental process. We were successful in narrowing the

eight down to five in the DEIS. Generally, the lower the number of alternatives, the easier it will be for the public to comprehend.

Selecting the number of alternatives relates to the scoping process. Some agencies look at scoping as a part of the process that one needs to get out of the way quickly. We have found scoping to be very valuable. For a current project that is about to go to a public hearing, we began with eight light rail options as well as the TSM alternative. In the scoping process, the community recommended a ninth light rail option, one that had been considered earlier by the transit agency but dismissed because of anticipated community opposition. We did add the alternative to the process and now it looks like the most promising one. Scoping can therefore be a very valuable tool in putting together a good alternatives set.

The next observation is to structure alternatives to isolate differences. I think this reasoning is consistent with UMTA's desire to give decisionmakers a range of choices in terms of capital dollars. Sometimes this can be good, but other times it is not so good. The public often has difficulty understanding why a wide range of alternatives and costs is being considered. It can be difficult to understand what the community is buying for \$200 million, or \$400 million, or \$600 million, or that there is much difference between alternatives.

Alternatives are to be defined so that they address corridor needs. One must not only look at the variation in needs, but also in the different prioritization of needs. Seldom in a major capital investment are you trying to solve one or two problems. Normally you might be trying to solve dozens of problems. I think a clear ranking on these problems leads to a much clearer definition of alternatives. Whether the need is to serve the suburb-to-center-city work trip versus getting inner city residents to suburban jobs, suburban mobility, or whatever your needs might be, a clear delineation of your

regional or corridor goals is very helpful.

With regard to intermediate cost options, we have one example in Baltimore where UMTA has been very flexible. We have an existing 14 mile heavy rail system and we were looking at a 1 1/2 mile extension from the downtown to the fringe of downtown. It was clear that the extension had to be underground, costing approximately \$300 million. In the Alternatives Analysis effort we only had three options -- the no build, TSM and heavy rail in tunnel. We worked with UMTA to agree that there were no intermediate cost options. Here is an example of where, through working with UMTA staff, we were able to establish that there were no viable intermediate cost options.

Let me now turn to the level of detail that is associated with the definition of each alternative. In general, the Guidance says you provide sufficient information for the level of planning you're in. For systems planning, you try to relate the alternative to what is appropriate for the region. For the AA/DEIS, you relate the data to what is appropriate for the corridor, but stay away from the specifics. When you get to PE/FEIS, you get to the specifics. In general, our experience has been that this is acceptable. However, there are many opportunities for flexibility. Our experience has been that a greater level of detail is often better in individual cases. For example, we have an example in Baltimore where there was an issue with regard to the track placement along a street section, something that would usually be examined in PE. However, we found that the business community from this part of the corridor wanted to know the specifics before they were willing to testify in the AA/DEIS public hearing. Here is an example of where we thought it was prudent to obtain further engineering detail. Another benefit was that this early data allowed the agency to better estimate costs, a key topic for UMTA and the local agency. There are two ways to provide this additional cost validity. You either provide more detailed data in the AA

stage, whether it is gathering soil borings or greater detail on engineering design, or you place greater reliance on cost contingency.

Another example is alignment changes. In AA, one is focussing on corridor-level issues. Whether a light rail line is on street A or street B is not highly significant. This is probably true for federal decisionmakers, and maybe even to the transit agency. However, it is keenly of interest to the public. One needs to strike a balance.

With regard to TSM, the Guidance suggests that perhaps more than one TSM alternative should be examined. Our preference would be to keep it to one. In all the years we have been involved with AA, we have never had the public, business groups or elected officials question the depth of the TSM option. The key for TSM is to find a single TSM option which is practical, implementable, and which offers balance. It should not try to be a cure-all, to do what a \$300 million alternative can do. It should provide a solution to a prioritized list of needs so that there is a viable option.

The Guidance also talks about incorporating demand management strategies, public policies like parking or alternative work hours, and other strategies into the Alternatives Analysis process. Despite the fact that these strategies might be beneficial to transit, I would recommend that these be left to the implementation stage. I can hardly conceive of talking to a business community about whether the tracks will be 30 feet or 50 feet from their property, and then ask them if they are willing to get rid of free parking. These are desirable elements that should come further in the process.

Another issue to be addressed is how to define the baseline conditions under which the do-nothing alternative is defined. Should one incorporate elements that "might" happen into the baseline? The do-nothing alternative, from our experience, is an option that stays away from controversy

and which doesn't try to guess what is in the future. The AA process is already complex without having to discuss with local officials what highways might be built. The do-nothing alternative should focus on what will happen over the next 0 to 6 years, not on what might happen further into the future.

Generally, the Guidance information on defining elements of a fixed guideway alternative is good. Over five AA's, we have never had a real debate about geometric standards or other definition of fixed guideway elements. My only observation is that flexibility should be allowed in the level of detail collected in the AA process.

A 15-year evaluation timeframe is recommended in the Guidance. I believe the shorter the timeframe the better. Fifteen years are much more reasonable than 20 or 25 despite regional forecasts of this horizon. It is much easier for the agency, elected officials, businesses and the public to comprehend what is being proposed. In fact, we have found there is a general acceptance of the long term benefits of transit, but a questioning of the short term impacts. The Guidance also suggests looking at a longer timeframe for the investment in capital facilities. I don't think there are many transit systems that are underdesigned. So, this should not be a problem.

With regard to highway network assumptions, I find it challenging enough dealing with people in looking at five or six transit options, without arguing about what should be in the highway network. The public could perceive this as an attempt to build more highways. In fact, over the past 15 years, we have found a changing perspective toward highways. Fifteen years ago, transit was viewed as an investment for the future, but highways were the way to get people around. Now, when people mention highways, there is often a negative reaction to the impacts the new highway can have.

Another issue is vehicle loading standards and UMTA's desire to keep consistent assumptions from one mode to another. As a transit agency, we have never understood how the loading standards on crowded local service should be the same for an express bus service or for light rail. This topic needs discussion.

Feeder bus planning should be viewed as a two step process. There should be enough feeder bus planning in the AA stage to be able to make sensible judgements about ridership and about station and facility planning. But you cannot determine at this stage exactly how many bus bays are needed at a station. Our experience has been that the level of detail needed for effective feeder bus planning is beyond that available in an AA. So, enough work to communicate to UMTA and to the public about the service philosophy you are going to have concerning feeder service, but not really enough for design detail.

In summary, the process of defining alternatives is a process for UMTA, for the local transit agency, and for the public. How do we accomplish a good definition of alternatives? First, we need a good set of prioritized needs. Second, minimize the number of alternatives to a reasonable level to minimize work and to communicate properly to the public. Third, have enough flexibility and level of detail so that all the issues can be understood.

Comments in Response by Don Emerson

I would like to add a footnote to Ken's comments on highway network assumptions. As we head into an era where there is more interest in multimodal planning, we should see a lot more efforts to do highway and transit planning together. We at UMTA see the entire planning process as a problem-solving exercise. Many times transit projects are advanced as potential solutions to a highway congestion problem, either an existing problem or a future congestion

problem. If the problem we are addressing is defined as a highway problem, there may very well be highway alternatives that should be looked at as potential solutions. Even though we are transit people, we should be reaching out to see if there are potential highway solutions that might be considered in Alternatives Analysis. Salt Lake City successfully performed a multimodal analysis where the alternatives included adding two lanes to I-15, adding four lanes to I-15, adding two lanes plus HOV lanes, building light rail, and widening I-15 two lanes and also building light rail. They ended up with twelve alternatives, and brought the highway and transit people together in a multi-modal problem-solving setting that was really quite useful. We will most likely see more of this in the future.

I would like to address Ken's point about only looking at the highway projects that are committed in the short term. This is something we often talk about as we reach agreement with the cities on how the alternatives will be defined. We do not usually consider the long range highway plan as a good indication of what is likely to be in place. On the other hand, the TIP is too short term. Defining what falls between is not easy. It requires a local consensus on which projects in the long-range plan are most likely to be completed.

My basic point is that we must be very careful about being realistic with regard to both transit and highway alternatives. As we head into more multimodal planning in the future, a good definition of alternatives will be a critical first step in making such planning successful.

ALTERNATIVES DEFINITION BREAKOUT SESSIONS

"If you are having trouble defining the no-build alternative, you're not ready for Alternatives Analysis"

The level of complexity associated with an Alternatives Analysis is directly related to the number and magnitude of the alternatives under consideration. As well, the acceptance of the final results can be related to how well the planners defined the alternatives during the planning process. This breakout session explored some of the critical issues associated with alternatives definition.

How should the no-build alternative be defined?

There were a variety of opinions among workshop participants in defining what should be included in the no-build alternative. Mature areas with an extensive transportation system would view a no-build alternative differently than areas experiencing rapid growth in largely untouched areas. There are two issues associated with the no-build alternative that are important to identify--the level of transit improvements to include in the no-build alternative definition and the projects to include in the background highway network. In either case, the philosophical and technical approach taken in one should be consistent with that adopted for the other. For example, if a conservative approach is taken in defining the background highway network, then a conservative approach should be used in identifying the no-build transit system.

There was general agreement that some transit service improvements beyond what exists today should be part of the no-build. The additional service should be financially constrained to improvements that can be made with existing revenue sources and should be limited to increased frequencies to accommodate increased demand or to extend service to growing areas. In this case, some suggested looking at the five-

year TIP improvements, others suggested a longer timeframe.

There seemed to be more concern for the background highway network, in particular about the issue of the network not being financially or politically feasible. The use of the term "committed" seems to cause problems because of different perceptions on what "committed" means. Highway plans and TIPs contain projects that are questionable. The key criteria in this regard seems to be financial, political and environmental feasibility. Making these determinations is not always easy. One needs support from system plans for these types of decisions. Sensitivity analyses can be used to examine the effects of variables for which there is some uncertainty, like the existence or non-existence of key highway links.

Many of the participants felt that the no-build alternative should be used as the basis for evaluation. Decisionmakers do not understand the TSM alternative and often do not agree that it should be the basis for decisionmaking. The analysis of the no-build alternative can give a lot of information on the needs and problems found in a particular corridor.

Are any changes needed to UMTA's guidance and use of the TSM Alternative?

Many of the participants felt that the TSM alternative was not meeting the objectives that UMTA had spelled out for it, i.e., serve as a good baseline for comparison and provide a moderate cost alternative. Some terms used by participants to describe TSM alternatives for which they were familiar included, "impractical, too costly, artificial, not relevant, strawman, and not viable". The primary criticism of the TSM

alternative seemed to be that it often does not serve the local purpose. In those situations where local officials have already made up their mind on mode technology, looking extensively at the TSM alternative seems confusing.

The general dissatisfaction with the TSM alternative was discussed from several different perspectives. Some agencies have very expensive TSM alternatives because of UMTA's perceived insistence of using TSM as a moderate cost alternative. Is it really necessary to have an alternative that is designed to fill a cost gap? If yes, perhaps the better approach would be to look at an incremental development of a guideway project. Because there was so much variation in the definition of TSM alternatives, the participants felt that it should not be used for the baseline comparison, although many noted that there are also problems with how one defines the no-build alternative. There was a sentiment that a middle ground between the no-build and TSM alternatives might be the appropriate base of comparison.

TSM planning should also receive great emphasis in system planning and should be an on-going process. In this regard, the participants supported previous statements regarding enhancing the system planning component of fixed guideway planning. With the Clean Air Act and new provisions of the federal transportation law, many participants felt that serious consideration should be given to incorporating more issue resolution into system planning.

Another suggestion that was raised in the discussion was that there should not be any work required on the TSM alternative after the locally preferred alternative report is submitted. The TSM alternative should be considered as a final EIS alternative the same way the no-build alternative is carried in a highway FEIS.

Should the AA process provide greater emphasis to policy alternatives?

The Alternatives Analysis process should consider, where appropriate, transportation demand management (TDM) actions such as parking management, land use management, pricing, etc. As before, these considerations should be present in the systems planning stage. Including these actions in the Alternatives Analysis process should be a local option, although they should not be included if there is not a firm commitment to their implementation. These types of policies become useful targets for "what if" sensitivity analyses.

The Guidance suggests that TDM actions be considered uniformly across all alternatives. Some participants felt this was reasonable except for land use controls where there might be different policies adopted depending on the type of alternative being implemented.

Are there ways to improve the definition of the fixed guideway alternatives?

The first AA/DEIS effort is often the most difficult. Based on the experience of the participants, the following recommendations were made to improve the fixed guideway alternatives definition process.

- 1) Those responsible for implementation should be involved early in the AA process. These include engineers and designers, service planners, operations staff, and city traffic engineers.

- 2) There should be a multidisciplinary group created of these types of professionals. It will not be easy to command the attention of these groups at the beginning because of the natural tendency of these groups to be worried about today's problems, not tomorrow's. Involving these groups, however, will result in much better alternatives definition.

3) A peer group pool, consisting of transit operators, planners, UMTA staff, and consultants, should be established to advise AA participants one or more times during the process. This advice should be constructive and non-adversarial. Such an exercise might help those areas which have already decided on an alternative before AA to broaden their perspectives to other possibilities.

4) A fixed guideway synthesis should be developed which catalogues technical descriptions of fixed guideway systems in North America. This synthesis would include operating characteristics, capital cost, ridership, operating cost, environmental impacts, speed, number of stations, etc. This synthesis would have to be updated periodically. Caution would have to be exercised about blindly incorporating data in the synthesis that could be misleading (e.g., unit costs).

There are many sources of error and uncertainty surrounding benefit and cost estimates for fixed guideway alternatives. These errors are produced during the initial alternatives definition stage as well as during subsequent work. It is important to realize that the numbers produced during the AA process will not likely be the final numbers. Therefore, do not concentrate on too much on detail.

The participants identified several sources of errors.

- 0 Not enough attention to mitigation measures
- 0 Elements added by elected officials after alternatives have been defined.
- 0 Benefit and cost estimates viewed as the "floor" for estimates. It is hard to resist adding new items later in the process.
- 0 Underestimating land costs and the costs for large construction activities (e.g, tunneling). In these situations, one might need better

design/analysis rather than better definition of the alternative.

0 Not enough attention to the TSM alternative.

Common practice in design is to add large contingencies to cost estimates to avoid underestimation. However, there are perhaps other actions that could help in developing good cost estimates. These include the items mentioned above, i.e., peer review, a guideway synthesis, and a multi-disciplinary team. In addition, it is very useful to obtain meaningful public input into the planning process so that one can deal with the public concerns early rather than wait until later in the process. This, of course, requires a tradeoff in the level of detail that is needed. Often, you do not get meaningful public input until there are specific details to discuss. This level of detail is usually not available until later in the AA process.

What should be the target year for forecasts?

UMTA currently requires a 15-year horizon for its cost effectiveness analysis, even though the Guidance is flexible about other planning activities. It takes a long time to change people's travel habits and to generate change in development patterns. Fifteen years is not long enough for these changes to occur. In fact, with a 15-year target horizon, there are usually only five years available after the opening of a project. Some areas use longer timeframes such as 50 years. Some participants felt there should be some consideration given to looking at 30/40/50 year horizons in system planning.

Others pointed out advantages if the 15-year horizon were changed to 20 years so that it was consistent with highway planning. There really is no technical difference between 15 and 20 years.

The participants also discussed opening year forecasts. An opening year forecast is troublesome. It builds public expectation which

could turn into a political liability. Such a forecast is not a useful planning tool. It is mainly used to provide some sense of the number of vehicles needed and the level of subsidy required while you wait for ridership to build.

What can be done to improve the operations planning process?

Transit operations planners and traffic engineers often do not talk to one another, and too infrequently talk to those involved in the AA process, especially the demand modelers and route schedulers. Operations planning, including both transit operations and traffic engineering (where on-street running is an issue), is essential in both systems planning and corridor analysis. It is important in defining and quantifying problems, assuring workability of concepts and detecting fatal flaws.

Operations planners and traffic engineers should be brought into the process early and should be involved in key aspects of the process, in systems planning, scoping, developing conceptual alternatives definitions, and reviewing assumptions and concepts as the process continues.

In system planning, the operations planner should help to define problems and to look at system concepts and technology tradeoffs (e.g., the implications of systems extensions).

In Alternatives Analysis, they should:

- review concepts, operational philosophies and operating assumptions to check the operating feasibility of the concepts (e.g., to avoid stations located on grades or curves).
- check institutional feasibility, i.e., will communities likely accept removal of curb parking? the location of a terminal in a certain neighborhood? etc.

- see if stated levels of service can be achieved, i.e., are operating speed, headway, and dwell time assumptions realistic?
- assess the reasonableness of operating cost assumptions.

To provide this expertise, it may be advisable to bring in outside peer groups with operations expertise, especially where new modes are being considered. Such groups should be brought in at the detailed definition of alternatives stage and continued throughout the process. The operating and service aspects of alternatives should cover such specifics as fare security, fare collection practices/policies, and where relevant, labor agreements.

Operating plans should look carefully at the coordination and complementary aspects of fixed guideway (i.e., off-street) transit with local bus services. The goal is the best overall transit system, not merely a fixed guideway element with the maximum number of riders on it. Some participants believed that phasing of operating plans should be considered in the AA process, while others felt that this would expand the number of alternatives under consideration.

Finally, as part of, and/or as an adjunct to, alternatives analysis, operations planning inputs should be considered in land use, site planning, and highway/corridor decisions.

What is the optimal number of alternatives to carry through Alternatives Analysis?

There are likely to be at least four alternatives that will be considered in the Alternatives Analysis process--no-build, TSM and two build alternatives. There will also be alignment options within one or more of the build alternatives. Experience with AA, however, indicates that local issues may require some alternatives that planners might otherwise want eliminated to be evaluated in the AA process. If any alternative has a meaningful constituency, it

must be carried all the way through AA, or to a point that everyone can agree to its rejection.

What level of analysis is needed in system planning to justify carrying different modes into the AA process?

The more alternatives screened from consideration in systems planning, the more reasonable the number of alternatives that must be evaluated in AA. The primary obstacle to limiting the number of alternatives will likely be political, where political is meant to include not only local decisionmakers, but also public interest groups. It is very important in this regard for cities where a rail system does not exist that local decisionmakers be educated about the attributes of alternative modal technologies, so that the likely costs, environmental impacts, etc. can be debated and used to screen alternatives.

The gap between system planning and corridor planning in allowing planners to screen out alternatives has led to the need for transitional AA's. The products of the system planning step, from a technical perspective, include a regional transit network configuration, corridor transit capacity requirements, types of likely technologies, and a prioritization of corridors. As noted before, system planning should also be used to make sure the technical methods and data are available to undertake a sound AA analysis and evaluation.

The winnowing down of alternatives in the systems planning step could benefit from a peer group assessment that would allow local officials to better understand limitations and constraints of certain types of modal configurations.

It is also important to identify early in the process those issues that are important, and to address those issues in a comprehensive manner. This includes identifying the organized groups that will be involved in the decisionmaking process. Early problem identification is critical,

as is developing a set of criteria that decisionmakers agree incorporate their concerns and applying these criteria in a consistent manner through the system planning process.

What impact will multimodal planning have on alternatives definition?

A new emphasis on multimodal planning could complicate the AA process by adding a number of alternatives if, by multimodal planning, we mean comparing highway projects with transit projects. A multimodal AA was considered by the participants to be exponentially more difficult, not just because of technical requirements, but because the process would likely involve multiple jurisdictions with different modal responsibilities, each having its own perspective on what alternatives should be evaluated. It seems likely that every corridor does not need to be treated in a multimodal manner.

Given the importance that multimodal planning will play in the future, the participants suggested that the U.S. DOT (not UMTA) develop guidance on multimodal planning. In addition, there was a sentiment that there should be a conference held with representatives from APTA, UMTA, FHWA, and AASHTO to deal with this joint guidance. It was felt that this guidance was needed now in anticipation of the likely effects of the Clean Air Act and the surface reauthorization bill.

EVALUATION

**Remarks by Ken Mowll
Office of Planning
Urban Mass Transportation Administration**

For the next 10 to 15 minutes I will be talking about the evaluation process. I will not be talking about cost per new rider, new riders over TSM, \$6 thresholds, or any other UMTA criteria. I know you all are wondering how I can talk for ten to fifteen minutes on evaluation without mentioning any of the UMTA evaluation factors. It probably never occurred to most of you that there is supposed to be a local evaluation process. That is what I want to talk about.

The interesting thing is that local communities are often putting up more money than UMTA is, and many times there is no local evaluation process. This is pretty clear to me when a new city comes in asking for a new light rail system and I ask, "Why do you need one?" I usually get a blank stare while the city representative starts to evaluate, for the first time, why they need an LRT system. I have heard some wonderful explanations of why a new fixed guideway system is needed. For instance, the reason for an LRT might be "the buses only run every 40 minutes and are smelly", or "we think Uncle Sam should give us one to celebrate our 100th birthday", or "its' divinely inspired". One group wanted an AGT system that connected seven shopping centers, a hospital and a college. Why? They wanted to use the college's parking lots for overflow Christmas shoppers.

We have in our Guidance suggested a framework for local decision making. We suggest an evaluation process that is pretty broad, one that can accommodate everyone's approach. It is just a framework. What factors you use locally are up to you. Hopefully, it will accommodate what everyone wants to do.

The framework is offered because a structure is needed. There are many local areas that decide what they want before they start the analysis. In those cases, they say what do we need an evaluation process for? We have already made our decision. You have not made a decision. While you may have selected a mode and an alignment, the tradeoffs associated with different alignments have not been made. There are therefore two levels at which you can view the evaluation process, one is a broader picture to determine a mode and the other is to determine alignment options or other tradeoffs within that mode.

The evaluation process should start at the very beginning with the determination of the local goals and objectives. What do you expect to get out of a mass transit system? What problem are you trying to solve? Certainly, we understand the local perspective is different from the federal perspective. I think it is very helpful that you have a local evaluation process. To determine local goals and objectives, you may have to provide several opportunities for local officials to determine what the goals/objectives are. This could be an excellent opportunity to get local decision makers involved early in the process.

You can then develop the data needed to see if each alternative meets these goals and objectives and also how much it costs.

The framework we propose for the evaluation of each of these local goals and objectives is first effectiveness -- how well does each alternative achieve that local goal? Second, cost effectiveness. How much does it cost for each alternative to achieve these local goals? Third, financial feasibility which will be discussed in a later session. And finally, equity. Equity is the tradeoff of, 1) who pays?, 2) who benefits?, 3) who suffers the environmental impacts?, and 4) who takes advantage of the new service?

We have discussed the need to determine early in the process what your goals and objectives are. You may need to convince your local decision makers to tell you what their vision is for the region or community, not that you need a light rail line. Or alternatively, you may need to force your local decision makers to tell you what they expect from a light rail line. And there are perfectly valid goals that are not really reflected specifically in the UMTA process, things like "we want to relieve congestion downtown", "we want to avoid a crowded freeway", or "we want to avoid circuitous bus routing", or "we want to provide more job access to a particular community".

These goals and objectives should be comprehensive, but not redundant. Many times, planners end up with a huge number of goals and objectives, many of which have insignificant differences in the numbers. To cover everything you need to, you may have to combine them. You do not need to analyze transfers three different ways. And the number of new riders is heavily correlated to time saving. Some of these things can be combined.

Let me talk about subjective criteria. How do you evaluate "fluff" topics? I do not think you can. It is much more important to have a framework that allows you to quantify and be able to say exactly what the impacts are. In terms of increasing the number of jobs to a particular community, you run the model and say that we increased the number of jobs accessible within 45 minutes by 14 percent. Is that good enough? Are these the kind of jobs the people in that neighborhood are qualified for? Should you instead be much more specific, especially since job access is your primary goal? Perhaps blue collar, low skill jobs should be identified. See how the access is improved to these kinds of jobs. This is especially important given that many of these jobs are being created in the suburbs and the new transit service may only improve access to the CBD. Let's be specific.

A lot of times we look at some goals and objectives and determine that there are no significant differences among alternatives. We probably do not need to discuss things like the number of endangered species affected by each alternative. It is not going to change and thus not likely to be important in your local decision making. So, identify those objectives that are important and concentrate on those. We all have to remember how good information is developed, and whether the forecast error is greater than the differences among alternatives.

I am hoping you will give us feedback on our evaluation chapter in the Guidance. I will admit to you that our equity section is very weak. Do we need it? Can it be written better? What we had in mind was the tradeoff of costs and benefits among groups. We could use some guidance.

We propose a tradeoff analysis to summarize all these impacts. Identify the significant impacts and say how they trade off, this one costs twice as much, but it gives you 50 percent as many riders. This one gives you three minute time savings, but takes 300 residential units, etc. In this way determine the tradeoff of significant factors.

Finally, I would like to talk very briefly about a city that had two corridor analyses going on at the same time. One was a federally funded project and the other was a locally funded project. Because UMTA required an evaluation process at the outset, a federally-funded corridor evaluation was undertaken and utilized. In the other corridor, the local officials just picked the solution. The federal process started out with goals and objectives, a lot of alternatives, and lengthy debates on how to evaluate the alternatives. Very quickly, it fell behind the locally funded corridor. Eventually, there was enough information for local officials to make the tradeoffs among the alternatives and alignments, and eventually the Board was able to select unanimously one preferred alternative

because it had the information available.

The other corridor was going to be a light rail line on an abandoned rail right-of-way. However, the community objected. They wanted to move it somewhere else. So, the decision was changed to put it in a tunnel under a freeway that was being reconstructed. For some reason that did not work either. So the rail line was proposed for under the freeway access roads. Then, the highway department got so far behind that they could not do that either. Now, they are once again talking about tunneling.

The local decision with no evaluation process to support it is now way behind the federal project, mainly because we required an evaluation process from the beginning. I think there is an important lesson in this example.

**Remarks by Daniel Brand, Vice President,
Charles River Assocs.**

Evaluation, which is the subject of this session, is the process of valuing alternatives, resulting in a locally preferred fixed guideway alternative that is also eligible for federal funding. Congress required in 1987 that major transit projects be cost effective. Resources are always scarce and we all agree that we should spend money wisely, at all levels of government.

UMTA's cost effectiveness index is a key element in rationalizing how UMTA distributes scarce federal resources to major transit projects around the country. The transportation planning profession was struggling already in the 1950's to implement a rational, comprehensive transportation planning process. That was even before the 3C requirement of the 1962 Highway Act. In the mid-1970's, UMTA introduced the Alternatives Analysis requirement. By then, the NEPA EIS process was very well established on the highway side.

However, the EIS was a procedural requirement.

It required that accurate information be produced on all of the important consequences of a major federally funded investment. A lot of highway projects were stalled and finally killed in controversy because their EIS was not done right.

The innovation of UMTA's AA process, as first stated in the 1976 policy, was that federally funded projects had to be cost effective. That is, they had to meet a substantive standard to be federally assisted. UMTA's 1984 policy went even further and set up a specific threshold of cost effectiveness and a rating system to compare projects with one another.

As you all know, UMTA's main cost effectiveness index, created in 1984, is the cost per new rider index. The project should not be built if it costs more than \$6 or \$10, or some threshold of cost to attract each new rider. This has considerable logic behind it. In the private sector, we make investments to attract new customers. If the costs of the new service are less than the revenues, that net result is the profit. We all understand that.

We also know that transit investments are not going to make a profit in the private marketplace. Our transportation markets do not clear very well and that is why government is in the game. Our marketplace is one where there are many externalities or social costs that people do not pay for as individuals at the time they decide to travel by transit or highway. From a public policy point of view, we want to make only those transit investments whose costs are less than their entire set of benefits to society, including reductions in the social costs of travel. Therefore, UMTA has calculated a cost-effectiveness threshold value equal to the national average value of the benefits from diverting an urban commuter auto trip to transit.

I have been asked to speak at this conference on how the AA process might be improved. In this context, I would like to make two points. These

are that, 1) the index is not well understood, and 2) because of this, UMTA may want to consider elements of a locally carried out benefit-cost analysis as a supplement to the index.

With regard to the first point, UMTA defines the cost effectiveness index by dividing both the costs and the benefits of the new investment by the number of new riders it attracts. If the costs of a new investment are less than the benefits, then the costs per new rider will be less than the benefits per new rider. As I have already said, this corresponds to the motives of the private sector to make investments to attract new customers. In the 1980's, the public sector was supposed to think like the private sector. Also, most of the benefits of transit result from attracting new riders out of their cars.

In view of this powerful logic, UMTA could not anticipate that its simple and seemingly easy-to-understand index was not too well understood by local officials. Particularly difficult to understand by the locals was how the \$6 or \$10 thresholds were calculated, and why these were not indexed to inflation by UMTA.

An example of how local officials and planners do not understand the index is the widely held perception that the index ignores benefits to existing riders. It is true that benefits to existing riders are not included in the calculation to the national average threshold value --the \$6 needed to justify a capital investment. But benefits to existing riders are also subtracted out from costs in the formula for calculating the index on a project-specific basis. This treatment of existing user benefits is consistent and logical. Indeed, benefits to existing riders can vary greatly from project to project, so it is logical to calculate these benefits separately for each project

However, it is still a mystery to many transit boards where the \$6 threshold value comes from. I feel like I am explaining where the Lone Ranger went when I say that the \$6 is really a national average calculated value of

benefits per new rider. e, it is in the formula for how you calculate the index locally on a project-specific basis, but it is not in the way the threshold itself is calculated. Where is that masked man, they say. They thought the \$6 was a cost, and now someone is telling them it is a benefit.

We should recognize that the AA process is a real setup for controversy. The federal involvement is to provide funding in a responsible way, given always scarce resources. There federal officials keep talking about costs per new rider.

On the other hand, local officials want to build transit for its benefits. These are perceived locally as economic growth, world class city, air quality improvement, mobility enhancement, congestion relief, and so on. While the flash point of the controversy is the evaluation index, the cost per new rider, the real problem is that federal officials are talking about costs and local officials are talking about benefits. The strongly espoused concerns of the two groups seem to be very different. Also, when federal officials talk about benefits, they appear to be critical, since they so often disagree with the locals about how many of the benefits of transit are illusory and how many are real.

My second point is that UMTA may want to consider adding the calculation of more benefits at the local level to the current local level calculation of benefits to existing users. This could reduce the perception that the feds are only concerned with calculating costs. It could also address a problem with the national average \$6 or \$10 index. This is that it may not be working well, in that it may allow projects to be built which are not cost effective, and it may not be blocking projects which are not cost effective. The reason for this is that there is substantial variation in the value of the benefit threshold when local values are substituted for national average values in its calculation (e.g., for such benefits as congestion reduction, changes in

parking subsidies, etc.) There are also variations in what is not currently in the index like impacts on the local transit deficit. So, project-specific cost effectiveness calculations have the potential for being a more accurate mechanism to screen out projects that do not provide net social benefits, than does a nationally calculated threshold of benefits.

It is possible that because local planners and officials are not asked to compute the local values of benefits, they do not know what is contained in or meant by the index. In addition, dropping the concept of a national cost effectiveness threshold has other benefits. First, the arguments about indexing the index (e.g., current dollars vs. 1984 dollars) would be eliminated. Second, and possibly most important, the Congressional prohibition on implementing the cost effectiveness regulations could be avoided. It would be hard for Congress to argue that local planners should not carry out cost-benefit analyses on their own projects, particularly when Congress has mandated that the projects be cost effective.

On the other hand, managing this process would not be trivial. Endless arguments may break out over the values that local planners calculate for the benefits of specific transit projects. Default values for certain categories of impacts may help. However, by comparison, the current process of requiring the locals to calculate primarily cost and numbers of new riders may actually be peaceful and easy to understand by comparison. A cost maximum per rider is an easy concept to understand. UMTA has obviously given a great deal of thought to the current process to keep it as simple as possible.

We are on the horns of a dilemma. It will take work and cooperation to make the process work better.

Ultimately, if the substantive standard of cost effectiveness is required also for highway projects, project-specific estimates of benefits

and costs will be needed. Cost effectiveness thresholds based on the benefits of converting auto trips to transit trips cannot be calculated for highway improvements. For now, however, on the transit side, we may have to settle for more cooperation and explanation of the mutually shared objectives of local and federal officials to make cost effective transit service improvements in this country.

Remarks by Steve Polzin, University of South Florida

It is a pleasure to be here today. Evaluation is one of my favorite topics. I am going to step back a bit. I will not talk about indices, formulas, or \$6.00 per trip, although I must say if not \$6.00, then what? Instead, I want to talk about the process, the environment for evaluation, and some specific structural and technical aspects of evaluation that I think are very important. I want to throw out some rather non-traditional ideas about the process, at least non-traditional compared to the process as we know it today. I recognize that change might be slow, but ultimately such change is important.

A good starting point for any discussion of evaluation is to look at the premise that there is a group of well-meaning technical staff, administrators, public, and decisionmakers that is interested in gathering information and subsequently making an informed decision. This is what Sam Zimmerman goes around telling everyone the process is designed to do. The reality is, in a lot of cases, this is not what is happening. So, the process is designed to support such a decisionmaking process, but that is not how decisions are actually made.

It is interesting to reflect on how well we are doing with respect to evaluation. If you review our record from the perspective of whether we are satisfied with the decisions we have made, there are not many cities running around saying that we should not have built the rail line, or

that they were wrong in their evaluation. Maybe they are not saying this because mostly it was not their money that built the facility. From the perspective of client satisfaction, evaluation seems to be doing fairly well -- but not that well.

There still remain serious questions about the validity of information used in evaluation, e.g., the Pickrell Report. And these concerns create serious credibility problems for the industry. There is also continued skepticism about the performance and merits of fixed guideway systems, possibly not in this room, but certainly in city hall chambers, board rooms, and editorial pages.

We have a very polarized environment. As you proceed through the decision making process, you hear many different arguments. Interestingly, these arguments often don't revolve around the formal criteria that we focus on in the technical planning process. "We can't pave over the whole state" is a good one. "Rail systems are inevitable" reflects a perception that, sooner or later, we must have a rail system, so why not build it now? Another one of my favorite phrases is, "It's visionary". We do not know what this means, but it certainly has a positive connotation, as does "mobility" and "congestion relief". You can always throw out descriptors like "21st Century" which gives a perception of positive, long term, progressive thinking. Other arguments include "inevitable solution", "preserve downtown", "the only alternative that will get people out of their cars", "overall mobility plan", "integrated", "balanced", and "infrastructure". All of these phrases or terms have been used in city after city to support rail investments.

There is the other side. There are some people who believe that rail transit's days are long gone. "We passed the point of no return with the introduction of the automobile." There is a group who think that those of us who plan fixed guideway rail systems and who especially talk

about integrated land use/transportation planning are really doing "social engineering". There is a big concern that we are trying to coax passengers out of cars which often becomes a justification for spending large sums of monies for increased speed and amenities. You have to wonder at some point in time how much we should spend to accomplish this. Downtown development interests, of course, often take the heat too--"Are these investments to bail out CBD developers?" One of my favorite terms is "trolley jollies" which refers to enthusiastic advocates who are often motivated to build transit systems.

If you want to characterize this range of opinions, the question becomes, "Is making a commitment to rail transit an insightful, visionary effort to proactively deal with urban mobility and other problems?, or is it a sign of naive, "me-too-ism" where urban areas keep up with the Jones' by investing tax dollars in over ambitious plans for convention centers, baseball stadiums, and rail transit?" The relevance, of course, is how does evaluation address all of these issues.

This highly polarized environment has two implications with regard to evaluation, 1) the expectations and opinions are highly developed and polarized, and 2) while we see these issues over and over again, we have been slow to modify the evaluation process to accommodate these concerns. It might be difficult to measure "vision" and "leadership", but I assure you these are the things that are influencing decisionmaking.

Let me now turn to some specific technical issues that I think are important to discuss. By no means should these be considered as the only technical issues of interest. They simply represent what I consider to be the most important and interesting ones.

Equity As An Evaluation Criteria: I am not particularly happy with the emphasis on equity. The need for transit, particularly fixed guideway transit, is not allocated uniformly across the country's urban areas or within urban areas. We cannot afford equity if equity means portioning out miles of fixed guideway in proportion to something other than the need for fixed guideway. In some of our largest urban areas, we may be able to have a system that is effective enough overall to support a poor or marginal line, however, many urban areas looking at fixed guideway only have a single or limited number of corridors with guideway potential. To focus excessively on equity will result in a system that does not reach its appropriate levels of effectiveness.

The implications of downplaying equity are fairly radical. While some sensitivity to taxpayer equity may have to be maintained, this could be maintained by providing other transit service or transportation investment in corridors unable to justify fixed guideway. We could go beyond this and include schools, parks, utility upgrades and other investments in other corridors to accomplish overall objectives of having equitable return on tax dollars. This type of program suggests decision making by a general purpose government -- significantly different than the dedicated transit agency approach that exists today.

Assigning Costs and Evaluating Multimodal Solutions: It is clear that multimodal evaluation will result in a much more complex evaluation process that will complicate decision making. A simple example of this relates to the problem of determining the capital cost allocation for transit in a multimodal project. For example, if one alternative in a corridor is a twelve-lane expressway and another is a ten-lane expressway with a guideway option, is the cost of transit the cost of the guideway or the cost difference between the ten lane facility with a guideway transit project minus the cost of the twelve-lane expressway project?

Estimating Economic Impacts: I personally have little confidence in our ability to evaluate the economic impact of projects. The multiplier affects make virtually any project appear cost effective regardless of the merits of the project. The stimulus aspects of projects suggest that virtually any investment is appropriate. If we are having the positive impacts on transportation that we imply, then there are real employment and economic impacts in areas such as employment in service stations, auto dealerships, parts stores and the like.

All Trips Are Not Equal: The evaluation process currently does not adequately reflect the significant differences between trip types. A discretionary, half-mile lunch hour trip on a circulator system that enables someone to experience a broader choice of lunch locations is a lot different than a fifteen-mile rush hour commute trip from a residential area to the downtown.

With regard to issues relating to the structure of the process, I offer the following observations.

Should The Evaluation Be Performed By An Independent Party? In light of the admitted interest of many of the consultants and agency personnel in seeing rail options implemented, it may be logical to consider having a third party involved in compiling, formatting and presenting the evaluation results. This could build on the successes of peer reviews by similarly involving outside persons in the evaluation. Thus someone other than the persons who developed the information would be involved in the process of making recommendations.

Is The Mode Selection Decision Being Made At The Right Point In The Process? While I have mixed emotions on this subject, it may be appropriate to consider making the mode selection decisions at the systems level for some urban areas. This has several advantages. Costs that are appropriately allocated over the full system can be more correctly evaluated than

having them all attributed to an initial starter line. Additionally, programming decisions can be made without the constraint of the single corridor rule. If the AA process is really a rail feasibility study made when the TSM alternative has already been dismissed from political considerations maybe this should be acknowledged and the process designed accordingly.

Are The Wrong Alternatives Impacting The Evaluation? The TSM alternative does not reflect the appropriate stream of costs and benefits of subsequent actions as the TSM alternative allows subsequent investments and plan refinements to meet evolving needs of the community. The benefits of selecting the TSM today may be ten years of TSM impacts and ten years of impacts from building a facility at a later date. The flexibility of the TSM is a virtue not captured in the evaluation. The AA process does not evaluate the best time to make a commitment to a given mode. I would recommend consideration of the "do something later" alternative for use in evaluation. Such a consideration might allow decisions to be made at a point in time when the level of certainty is increased.

Are the Right Evaluation Objectives Being Defined? I am also troubled by the fact that the objectives for rail projects extend well beyond the transportation objectives to include a variety of environmental and economic considerations. If we expect to accomplish a full range of objectives not exclusive to transportation, then I think we should not restrict ourselves to an investment program that relies exclusively on transit or transportation investments. We may be able to more fully attain our desired objectives if we have, as alternatives, packages of investment options that include elements beyond public transportation. We may, for example, reach a more optimal solution if we use a TSM alternative to meet the transportation objectives, a zoning and permitting program to meet the land use objectives, and a program of

incentives and other investments to meet the environmental objectives.

Are We Asking More Of Transit? This refers to the level playing field argument of whether or not we are placing higher planning standards on evaluation of transit relative to highway projects. While this may well be the case, it certainly does not argue to lessening efforts in transit.

Is the Level Of Detail Required For Decisions Overloading The Process? The level of desired details in several areas such as relocation impacts, ridership, operations plans, physical design, station art, DBE opportunities, and others often overloads the evaluation and decision process. It is not uncommon to have decision makers desire a great deal of information early in the process. Building coalitions for support often results in numerous details being studied early in the process and complicating the evaluation.

Do We Need A More Incremental Range Of Alternatives? There are typically large differences in costs and benefits when one goes from the TSM alternative to the build alternatives. This large increment does not offer as incremental a range of investment options as might be desired. It would be nice to have a more uniform range of alternatives.

Do We Value Engineer The Preferred Alternative? Because of the strong predisposition to a given alternative in many cases, there is a strong tendency for the preferred alternative to get special treatment that will make it look more favorable in a comparative evaluation. The cost and performance of the rail options are often optimized while the performance of the other options is left as is. It is not very often that someone tries to optimize the performance of the TSM or busway alternative.

Are Financial Capacity Considerations Forcing The Process?

In an effort to insure the financial capacity to carry out an alternatives analysis study and to move beyond the study stage, many urban areas make organizational and funding commitments to fixed guideway transit before the completion of the Alternatives Analysis stage. Typically, to move ahead in the planning process, a region will try to build a coalition of support. This involves the development of a physical plan including the specification of corridors and frequently a commitment to rail transit. This early commitment of a dedicated revenue source results in a strong bias to a "build rail" outcome prior to a formal decision on rail.

An alternative arrangement would be to have more locations rely on general purpose governments or multimodal funding to fund transit implementation. This may reduce the strong vested interest in guideway implementation as a prerequisite to agency survival.

Is The Level Of Uncertainty Greater Than The Differences Between Alternatives?

This refers to the concern that the levels of uncertainty in our ability to forecast key attributes such as operating and capital cost, ridership and implementation schedules, and the ability to discipline the decision process to live within schedule and budget commitments, is such that the uncertainty in estimates is often greater than the differences in performance between many of the alternatives. This can discredit the results and result in decision makers relying on other factors to make decisions. While no solution is readily available for this problem, it should be acknowledged in the conduct of alternatives analysis.

In summary, evaluation is a critical component of the Alternatives Analysis process. It provides the framework and information-base to support decisionmaking. However, as suggested by these remarks, I do not think it is working the

way it is designed to. We need to do a better job.

EVALUATION BREAKOUT SESSIONS

"You must be able to answer the question, why do you want a rail system?"

Evaluation is the critical component of any planning process where the information to be presented to decisionmakers is obtained and refined. As such it is a critical step in the Alternatives Analysis process. The workshop participants identified several characteristics of evaluation that were deemed essential for successful planning and made several recommendations for improving the evaluation process. At the outset, it is important to understand that the UMTA Guidance defines four components to evaluation--effectiveness, cost effectiveness, financial feasibility and equity.

What role do federal and local agencies play in the evaluation of alternatives?

The workshop participants discussed several important characteristics of the federal and local government's role in evaluation. UMTA's role is shaped by a program that is defined by Congress and which has two striking elements--a new starts program which represents a rare, sizable, discretionary federal grant program, and an extremely limited amount of funds actually appropriated. It seems clear that UMTA feels obligated to distribute these discretionary dollars as wisely and justly as possible. But defining what is wise and just has been a struggle. One participant argued that the European perspective of metropolitan areas as "machines" producing goods and services is a useful approach to justifying investments such as fixed guideways. Whatever type of investment that enhances the workings of these regional economic machines is a good investment. This type of approach was not considered totally alien to the U.S. environment in that UMTA was originally part of the Department of Housing and Urban

Development.

In the Alternatives Analysis process, UMTA has developed a structured decisionmaking framework which includes a sound problem statement and rational, measurable goal achievement for the locally preferred alternative. It seems likely that some of the benefits of fixed guideway investments that are most important to the community are often the most elusive to measure, and thus often discounted in the federal process. Does this suggest that a wise and just program needs a broader definition of metropolitan goals, perhaps one that fosters the functioning of the "regional economic machine" mentioned earlier?

The participants also agreed that UMTA's questioning of local financial capability, although sometimes embarrassing, is an important function of the federal government.

Local government officials often face very different pressures and concerns than those assumed in the planning process. Each local area has very different processes for decisionmaking and often involves very different actors. The workshop participants examined the local government perspective from the point of view of a local area that did not have the funds available and no decision had been made about the preferred alternative. What do these decisionmakers really need to know?

The decisionmakers probably first want to know public opinion. The closer the officials are to the public, the greater the influence of such public opinion. Second, what is the problem that the fixed guideway project is addressing? The problem must be coherently stated and the goals established. However, the "softer", not

easily quantified benefits such as shaping of land use, guiding economic development, and improving the quality of urban life are very real to local officials, but tend to be easier to assert than prove. There is a definite need to reconcile the different perspectives between UMTA and local officials on these types of benefits. It is recommended that UMTA update, with "a much wider lens", the common knowledge base of these types of effects of fixed guideway investments.

Local officials also need to know whether the prospects for financing a fixed guideway investment are realistic, given the costs, operating consequences, and other priorities. The participants observed that there is a tendency at the local level not to worry about costs until after local expectations on a preferred alternative have been built up. Local officials could therefore feel trapped into choosing an alternative even though it may be unaffordable to the community. UMTA might want to require local officials to address this question more forcefully before being permitted to initiate an AA.

In this regard, state officials are becoming more actively involved in the funding of fixed guideway investments. These officials are often more removed from public opinion and are faced with a broader array of competing transportation priorities. They are more prone to focus earlier on the financial risks and consequences of proposed investments.

Perhaps the most difficult situation for local officials is where local voters have voted revenues for a specific transit facility which has yet to go through an Alternatives Analysis. Such a situation is very different to reconcile with the AA process as UMTA would like to administer it.

Does UMTA's four factor evaluation process cover all important dimensions that should be considered?

Do the four factors in the evaluation process, i.e., effectiveness, cost effectiveness, financial feasibility, and equity, lend themselves to local decisionmaking? The participants felt that the UMTA evaluation process does allow flexibility for the process to be structured to focus on issues likely to be important to local officials. Evaluation is related directly to the purpose and need of a project, something local officials should desire. Strong public involvement throughout the planning process will assure an incorporation of any local issues that might not be covered in the evaluation process.

Some participants suggested that an "environment" section be added as a fifth component of UMTA's evaluation framework. Environmental criteria are already included within the effectiveness category, but some participants felt that to emphasize environmental impacts and to acknowledge the fact that the AA also serves as a DEIS requires a fifth factor.

Most participants felt that multimodal planning will add a significant level of complexity to evaluation. There currently is not a "level playing field" between highway and transit agencies and thus there could be some disadvantage to transit agencies to participate in a true multimodal study. For example, travel time savings are the primary benefit for highway projects while new riders is the most important criterion for transit. Certainly, travel time savings is a relevant criterion for transit as well, but if a multimodal planning study was to use travel time savings as a primary benefit measure, transit methodologies would have to be modified.

It is important to present to local decisionmakers very early in the process what the evaluation framework will be. Some areas have developed

decisionmaking guiding principles that allow decisionmakers to see how the evaluation framework fits into what they established at the beginning of the planning process.

The participants felt that the four evaluation factors force local officials and the public to think about issues that may not have been thought of or which might have been ignored. This results in better planning practice, and ultimately in a better transit project.

The system planning process was identified as a critical element in the planning process that needed strengthening. A participant likened system planning to window shopping for an expensive item; Alternatives Analysis as establishing collateral for a loan application, and preliminary engineering as actual decisions on how much money will be loaned. The participants agreed that additional guidance on systems planning needed to be developed.

What has been the experience with the cost effectiveness indices and threshold?

The cost effectiveness index received a great deal of attention in the discussions on evaluation. Many participants felt that changes were needed in the application of the cost effectiveness index and the threshold values. Although it was mentioned that the Guidance does allow local planners to use a consumer surplus approach to benefits estimation (cost per travel hour saved), most participants felt this was too complicated.

The cost effectiveness index was developed by UMTA in response to Congressional statements about cost effective investments. The participants felt strongly that the cost effectiveness index was not useful to local decisionmakers. The participants felt that the index was too narrowly defined, too arbitrary, and if multimodal planning were to become a reality, probably not applicable.

Some participants felt that the index should be expanded. In addition, land use and parking policies should be allowed to vary across alternatives, and these policies should be enforceable, perhaps through the full funding agreement.

Another suggestion was to have multiple standards of cost effectiveness measures. The cost per new rider criterion is not useful in all cases. Perhaps a local benefit/cost ratio is a more appropriate measure, and one that would be more acceptable to local officials. The existing formula should include travel time savings for all riders in the numerator, not just existing riders. Likewise, the denominator should not include just new riders. There are other issues that might be important, for example, including some measure of passenger miles to reflect the amount of VMT that is removed from the street network. Some method of incorporating indirect benefits, e.g., air quality improvements, energy conservation, etc. should also be developed.

The threshold values should be updated to reflect the changes in costs that have occurred since they were first formulated.

Apparently, UMTA is in the process of examining alternative and better indices for cost effectiveness. Most participants strongly recommended that a joint UMTA/APTA committee be formed to discuss any revisions to the cost effectiveness index before any notice of proposed rulemaking is promulgated.

How can the cost effectiveness indices be made more meaningful to local decisionmakers?

Many participants suggested that local officials do not use the index primarily because they do not understand it. The index is not viewed as a continuum or as a means of ranking projects, but simply as a threshold that must be reached for the project to warrant federal financial

consideration. In addition, local officials are looking at much broader issues, often many of which cannot be quantified. And, in many cases, the decision to build something has already been made, so local decisionmakers are not interested in a cost effectiveness index. This, of course, could vary by metropolitan area. In those situations where there is a large number of projects to be considered, some form of cost effectiveness index might be of interest. In those situations where the transit investment is considered to be once in a century opportunity, a cost effectiveness index might matter little.

However, even given local apathy toward the index, the participants still felt it was important. There was a feeling that it would work better at the systems planning level, not in AA. It is in system planning where tradeoffs can be made, and these tradeoffs are not just within transportation. Many local officials are faced with deciding how much money goes to transportation versus other public services. At the systems planning level, the key issue is affordability.

Even with the problems associated with the cost effectiveness index, some participants felt that having gone through the exercise of calculating the index helped refine the project.

How can cost effectiveness concepts be expanded to cover a range of multimodal alternatives?

If multimodal planning is to be undertaken in the future, there needs to be a great deal of study on how it should be applied to transit. The participants felt that there were some fundamental differences between highway and transit projects. Transit was viewed as inherently a public cost and public action activity. With highways, you need to bring private costs into the evaluation. A more appropriate index for multimodal planning might be benefit/cost ratios.

No matter what happens technically, institutional changes are needed. Who makes the ultimate choice? How is the process structured? What other interests might need to be brought into the planning process? (e.g., those interested in airport access). In addition, greater emphasis will have to be placed on developing improved data bases and methods for transit analysis so that highway and transit projects can be compared on an equal footing.

How can effectiveness evaluation be improved?

Effectiveness is the first factor listed in the UMTA Guidance, but it is often considered last in the rush to get to cost effectiveness. Effectiveness deserves greater attention because these are the benefits that are expected to accrue from the transit investment. Effectiveness provides an opportunity to look at these benefits and consider a broad range of issues and evaluation measures. It basically explains why you are even looking at a transit investment.

It is important in effectiveness that local planners examine a full range of benefits, including non-transportation benefits. This has been discussed before, but workshop participants felt that these so-called indirect benefits should be addressed head-on. There was a feeling that UMTA was willing to look at anything in the evaluation process, so the advice was to include them in evaluation. UMTA must provide consistency across all AA's so they might not place a great deal of weight on issues that are of greater importance in one locality over others. However, given that the AA is also a local document, locally important issues should be discussed in the document.

How can the section of the Guidance on equity be improved?

Although equity is often not considered to be the most important factor, participants felt that it

should continue to be a consideration in evaluation. If evaluation is a process to identify what is different between alternatives, then it is important to identify who will benefit and who will pay for proposed investments. In some corridors, there might be considerable equity issues, whereas in corridors that are more homogeneous, such a concern might not be that great.

Participants felt that equity issues should be definitely part of system planning and should be important in selecting the priority corridor. In AA, however, it is only one criterion among many, although for environmental documentation, equity issues should be identified in the scoping session. The level of concern for equity throughout the process should vary by the context and step being undertaken. For example, there might be important equity issues associated with ridership assumptions, cost allocation, and environmental impacts.

Participants decided that there was no best technique for undertaking equity analysis. However, it was deemed important to let local decisionmakers know that equity is not included in the cost effectiveness index, even though the index will clearly have equity implications.

The final issue debated in this session was whether an evaluation focus on new riders was appropriate given the likely impacts on existing riders. A new service that provided high speed, fewer stop service to suburban areas at the expense of inner city low income riders should clearly be examined in any equity calculation.

FINANCE

Remarks by Ed Thomas Urban Mass Transportation Administration

I was asked to provide an UMTA perspective on the subject of fixed guideway financial planning. To do so, I divided this talk into four sections. The first section describes the framework and role of financial planning and analysis in the major capital investment project development process. This section is followed by a discussion of financing options. Section three covers pressing financial analysis issues. The fourth and final section addresses risk and uncertainty.

PROCESS

The investment decision, (i.e., what should be implemented), and the financial decision, (i.e., whether the investment is affordable and how to pay for it), are nearly inseparable. UMTA acknowledged this close tie in the 1984 issuance of the Major Capital Investment policy, which incorporated finance as an evaluation criterion along with cost-effectiveness. Procedural and technical aspects of the policy are detailed in the project planning guidelines. Codification of the 1984 policy occurred in 1987 with enactment of the Surface Transportation and Uniform Relocation Assistance Act (STURAA). STURAA specified in Section 303 that, "the degree of local financial commitment" was one of three criteria for making new starts funding decisions.

STURAA is a model piece of legislation for mass transit finance in a number of regards. First, regional, long-term financial planning was added to Section 8 of the UMT Act. Second, advanced construction authority was provided under Sections 3 and 9 as one way to promote more cost effective cash draw-down schedules. Finally, capital leasing was authorized under

Section 9 of the UMT Act, as an alternative to purchasing assets. Along with the existing joint development provisions of the UMT Act, the advanced construction and leasing provisions offer the best opportunities to leverage federal financial assistance.

Financial criteria in STURAA and the major investment policy mesh well with UMTA's financial capacity requirements of the UMT Act and clarified in a 1987 Circular. The Circular seeks a determination of transit agencies' financial condition and capability to meet future obligations. Financial capacity is particularly important in light of out-year operating, maintenance, replacement and rehabilitation costs; increased local fiscal effort; and the risk and uncertainty of major capital investments.

A few statistics will illustrate these points. As of 1989, the book value of transit assets nationwide had reached \$53 billion dollars. It is estimated to cost \$200 billion to replace these assets. Looking at the industry's ability to meet current obligations, we see that the ratio of liquid assets to current liabilities has declined since 1979. The ratio reached 0.94 in 1989, although prudent business management suggests a minimum ratio of 1.5. However, a closer review of this ratio found the majority of the largest systems and ones with dedicated taxes exceeding 1.5. Risk and uncertainty of capital projects are evident by the fact that capital costs for major projects typically exceed forecasts. Much of the cost variance is due to design changes, schedule changes, and overly optimistic economic and financing assumptions. Inadequate project and financial control may account for some of the unexplained cost variance.

Now, one could ask, what does all of this mean in terms of system planning, Alternatives

Analysis, and preliminary engineering? A quick response is that the regional financial planning provisions, the New Starts financial criterion, and UMTA's financial capacity provisions provide the procedural framework for the financial planning and analysis which are conducted in various phases of the project development process. It is plausible to say that these provisions basically represent good professional practice in transportation finance.

Let's look closer at each of the three phases. Consistent with the regional financial planning and the financial capacity provisions, it is suggested that system planning inventories evaluate the existing transit asset base and determines the region's financial capacity to operate, maintain, and recapitalize the existing transit system. System planning also establishes relationships between transit and land use development, and if necessary, identifies, analyses, and evaluates new sources of revenue for regional improvements. The products of these efforts can support decisions on corridor priorities, a request for Alternatives Analysis, and other federal and local decisions.

Alternatives Analysis is where a range of capital and operating funding alternatives are explored. This range would include various levels of federal funding, and a variety of techniques for the local share. For the capital local share, the methods of financing typically include one of, or a mix of, buying, borrowing, or leasing. These financing methods can be combined with a number of cost reduction techniques like joint development, certificates of participation, advance construction funding, interest rate swaps, private equity, and various procurement techniques like turnkey development. In developing financing options, minimizing financial risk and avoiding biasing any of the transit options are key objectives in the Alternatives Analysis process.

On the operating side, efforts are made to match sources of revenue with beneficiaries so that the

cost of providing transit accessibility improvement is shared. Benefit assessments, tax increment financing, and air rights leasing are examples of benefit sharing strategies. These strategies are more applicable to operating deficits since they are weak debt security devices.

In Alternatives Analysis, each funding option, including its sources of revenue, is presented in an annual "sources and uses of funds" format. Driving variables are tested for risk and uncertainty. Then, funding options are evaluated, and procedures for securing unsecured, unauthorized, or unappropriated sources of revenue are developed. The evaluation results are used as input to the determination of the financial feasibility of the transit alternatives and to the development of the financing plan for the locally preferred alternative (LPA).

The LPA financing plan is refined during preliminary engineering and, more importantly, a financing work plan is incorporated into the project management plan. This assures that the necessary financial analysis work is performed and that sufficient organizational and staff capabilities are provided for. Preliminary engineering is also where systems and procedures are developed for controlling costs for implementing the financial plan, and for further assessment of risk. This would include project level systems for tracking change orders, job costs, inventory, and accounts payables, for sizing debt issues, for solidifying joint development, and for managing cash.

FINANCING OPTIONS

Now that I have completed a discussion of the process, let me address issues associated with the financing alternatives.

Solutions to urban mobility problems can no longer be considered in transportation terms only. Financing, land development and

implementation strategies must play equal billing. Don and Greg alluded to this point in their views on alternatives. Ideally, major investments would be proposed only if base system financial requirements are met. In essence, base system financial capacity provides a benchmark for defining capital improvements and their financing options.

Let me define more clearly the three generic types of financing techniques--buy, borrow, and lease, and the typical conditions for which they are used. Pay-as-you-go involves the use of working capital to support project implementation. This method of financing is generally used where substantial unencumbered cash reserves exist, bond authorization does not exist or the current amount of financial leverage is excessive.

Bond financing generally involves the issuance of tax-exempt long-term securities backed by a ratable source of revenue. Debt is normally used where revenue flows are insufficient to cover capital requirements, where sufficient leverage and liquidity exist in the issuing agency, and when long term improvements are supported by long term sources of revenue.

Leasing involves the use of assets in return for specified rental payments to the asset owner. Leasing is most effective when the benefits of being a lessee outweigh ownership of the assets.

Sources of revenue are well known. They include broad-based taxes (retail sales, property, payroll, income or occupancy taxes); charges on motor vehicle users (motor fuels, parking fees, and tolls); charges on benefiting property (service charges, special benefit assessments or taxes on incremental value) and income from jointly developed property. Although, we talk extensively about creative financing techniques, it is important to note that broad-based taxes and user fees are the most ratable sources for securing debt.

FINANCIAL ANALYSIS

Transportation planning and engineering are faced with a number of new challenges. Expertise is now needed to analyze site specific development impacts and markets, to estimate non-user benefits, to assess the impact of revenue sources, to develop optimum financing options that are sensitive to the market and regulator environments, to estimate project risk, and to develop project level financial control systems.

It is clear that transportation professionals are familiar with the management science techniques being used in finance today. This includes engineering economy techniques as was mentioned by Paul Bay, optimization models, forecasting models, marketing analysis techniques, project management procedures and variance analysis techniques. We must expand the application of these techniques in defining, assessing and evaluating financial options. Here are several examples for consideration.

- Net present value analysis should be used more often in evaluating financing options involving different costs of capital, depreciation schedules, tax conditions, or maturation periods of the revenue sources and financing strategies.
- Revenue forecasting models are needed to develop annual revenue cash flows which are more sensitive to the cyclical nature of the economy.
- Cash management models should be developed which integrate the construction and procurement schedules with the funding schedules.
- If joint development is considered a serious contributor, procedures should be developed which produce integrated site and functional plans, assess real estate market and financial feasibility,

integrates facility design, promotes property owner involvement, complies with local planning and zoning requirements, and meets all conditions for federal assistance.

- Transit industry financial benchmarks are needed for assessing financial capacity and determining risk levels in the industry. UMTA has commissioned research to develop these benchmarks.

ASSESSMENT OF RISK AND UNCERTAINTY

This brings me to the final section of my remarks and I have three points to make. Typically the final step in a financial analysis is the assessment of risk and uncertainty, including ways to manage risk. First, let me define risk. I define risk as essentially some deviation from an expected outcome. For New Starts projects, the areas of most concern are design, financial, construction, procurement, and completion risk.

We are all familiar with spread sheet analysis techniques where key cost and revenue driving variables are tested for their response to changing assumptions. For example, sensitivity tests of capital costs might consider changes in inflation, construction schedules, contingencies, and interest rates and sensitivity analyses of revenue forecasts might test the impact of changes in inflation, interest rates, retail sales, employment growth, personal income, property values, auto usage and other independent variables of the forecasts. However, more work needs to be done in order to make the results of these sensitivity tests more usable in the decision-making process.

Here is further food for thought. The capital asset pricing model used in the private sector might prove useful in establishing acceptable levels of financial risk for New Starts projects. This model estimates risk based on variances in expected returns for certain types of

investments. Given historical trends in actual returns, risk-free rates and average returns for the industry of that investment variance analysis might also prove useful in establishing confidence intervals for O&M cost estimates. You might find turnkey development as a helpful way in managing design and construction risk. John Sedlek's group seemed to have seconded this point.

In sizing completion risk we might consider determining a threshold level of risk by estimating the maximum value of work in progress over a project's construction schedule. This level could ultimately be used to set the performance bond of, for example, a turnkey contractor.

Remarks by Sharon Greene, Executive Director, Los Angeles-San Diego Rail Corridor Agency

Let me preface my comments by observing that the organization of this conference seems to reflect well the Alternatives Analysis process--evaluation and financial capability are left to the end. Just as in real life planning, the project teams must deal with the most complex issues at the end and distill them in a meaningful way.

My own contribution to this panel is a process issue. One reason evaluation is often shortchanged in the document is because everyone else has taken the time to do the thorough analyses. Capsulating and comparing at the very end is often difficult. Similarly, you have completed the revenue forecasting effort, but until you complete the cost estimates, you cannot complete a financial analysis. At such a point, you often need to perform miracles to make all of the numbers balance. It is thus difficult to get through the Alternatives Analysis financial analysis process, especially when the time is constrained at the very end.

Let me now discuss the financial analysis

process from a consultant's perspective. Many of the issues I will discuss are probably familiar to most of you, and are similar whether you come from the private sector, public sector, or even from the perspective of a federal evaluation role. My presentation will cover five major areas: an overview of the financial analysis process, a review of applications of this process, how this process evolved, a review of experience with financial analysis in the fixed guideway decision making process, and the major issues we must collectively deal with.

Financial planning - There is a financial planning process just as there is a 3C planning process. When we talk about financial analysis in the financial planning process, I think we are taking something that should be an on-going function and trying to look at fitting it into rationalizing and assessing the risk associated with a fixed guideway investment decision. But financial planning itself is an on-going process of looking at financing your capital and operating/maintenance costs. It is not, by any means, a one-time process.

Financial planning typically includes a comparison of costs to revenues over time, identification of new funding sources, projected cash flows, and then focuses on an assessment of project risk.

The technical steps in the financial planning process are fairly straightforward. You first project your costs and revenue streams for both capital and operations/maintenance, typically in both current dollars and year-of-expenditure dollars. Politicians know what you are talking about in today's dollars, but you are dealing with differential inflationary effects on costs and revenues. This is important because, in some cases, revenues will not increase with inflation, but the costs will. The comparison of costs to revenues will focus on whether you will have annual surpluses or shortfalls. Clearly, if you have annual shortfalls, you will have to examine supplementary revenue sources.

You typically will conduct sensitivity analyses on key variables that could affect revenues. These analyses could also focus on factors that will affect your costs. Have you realistically assessed misinformation? Or have you built in sufficient contingencies between system planning and Alternatives Analysis?

The next step is to determine financial risk. You will look at things that were examined in sensitivity testing -- the effects of inflation, the effects of differential project cost, and the effects of different growths in revenue streams (e.g., fare policies). You need to assess a range for judging how great a risk could be associated with your project and what are the key variables that will affect your ability to continue with your investment. Then you would document your financial capacity and condition, one focussing on the project itself and the other on the agency or the applicant. What has been your past performance, as well as your projected performance? Then, you should be refining this financial program as you go toward building and operating the system.

It does not end with just building the system. It should be something you live with throughout your operational phases, as well.

Applications - Typically, one would do a financial analysis as part of a short range transit plan and identify what the projected needs are over a five- or seven-year period. In some cases, agencies look at a ten-year period. Unless you have a guaranteed source of funding, the multi-year financial plan is most often 1) revenue-constrained, 2) looking at funding from a relatively limited number of sources, and 3) focussing on programming rather than planning. You are looking at project scopes and implementation phasing in a constrained way. You are looking at alternative procurement strategies for things like buses, and building a new maintenance facility. You are not dealing with the major decisions associated with building a fixed guideway investment.

More typically, a fixed guideway investment requires a documentation of the need for a new revenue source. When you are documenting this need, your financial plan becomes part of a plan that you are hoping to sell as a package to your voters and politicians. I think this is one of the areas that becomes somewhat problematic for us in the fixed guideway planning process. At what point do you predefine some of the issues that you will have to deal with in system planning and Alternatives Analysis? And what is the relative timing that we have to deal with in making these decisions?

Another application is to evaluate alternative funding scenarios. You can not just count on getting 75 percent UMTA funding even if you are very creative in how you define your overmatch program. You have to look at alternative funding scenarios that range from zero UMTA funding up to whatever level you negotiate with UMTA. You are also looking at different funding scenarios with alternative local sources of funding, not just one or two sources. The complexity of funding, not just for your project but also for your system, becomes a very complex exercise where you are looking at optimizing a blend of very different revenue sources and combining them in very creative ways.

What do we want to do? Clearly, we want to document our financial capacity to the funding agencies, including UMTA, local city councils, state legislatures and any other agency that provides some portion of the local funding. So, demonstrating financial capability is important. Assessment of risk once again is important because we are now moving ahead with a project using the bond community where pay-as-you-go financing requires documentation of our capability to credit and funding agencies.

Evolution - We have clearly seen an evolving role for financial planning and financial analysis in the transit decision making process. The pre-

and post-1984 periods indicate that since 1984 not only are the hoops getting higher, but they are coming at us faster. Things that we used to do when we went from Alternatives Analysis to preliminary engineering, we now do in going from system planning to Alternatives Analysis. As the process has evolved, UMTA has defined more and more the specific financial planning techniques that are to be conducted. They are tying federal decisions on the project, and even permission to go through the process, to specific financial criteria.

The 1984 Capital Investment Policy defined the four phase approach to fixed guideway planning -- system planning, Alternatives Analysis, preliminary engineering and final design. This process left us with the beginning of an emphasis on cost effectiveness indices and local financial commitment. However, at that point in time they were not well defined. It introduced the concept of having a federal comparative rating system, and that UMTA approval would be required to go into the preliminary engineering stage of your project.

As we move forward from 1984, we see that the UMTA policy changes and it becomes not just interest in your ability to implement a project, but also on the agency's financial capability and whether the agency has a stable and reliable revenue base.

In 1986, the Alternatives Analysis Guidance was first issued and represented a major step forward in advancing the state-of-the-art of transportation planning, analysis and decision making. Workshops like this are excellent because they mean we are taking something that was an excellent beginning and making it better. In terms of financial analysis in the documentation, there is a two-fold thrust - financial condition and financial capability. We are not just looking at the project and the proponent; we are also looking at past performance of the proponent and present and future capability of the proponent as well. So, it is a very complicated

and comprehensive process for evaluating financial performance.

By 1989, UMTA entered a new arena by specifying an Overmatch policy. The objective was to encourage greater local financial participation and stretch federal funds as far as possible. UMTA will give priority review to a project if there is a less than 30 percent federal share requested. Clearly in an effort to encourage local overmatch what we have to collectively deal with is whether a local overmatch policy is something that is very workable for those who have a guaranteed revenue source and can look at how to take another project and consider a portion of a related project as local match. But in many cases we may have a desirable project at a local level where that same local overmatch matching game cannot be made. This project is a justifiable project that should be considered. UMTA needs to deal with the issue of what is the relative role of overmatch for a cost effective and desirable project that has federal and local benefits?

Experience - In the fixed guideway planning process, the effort is to get your project included in the 3(j) report which provides the UMTA list of recommended projects to Congress. We have two sides of the picture. We have the objective evaluation that comes out of the "3(j)" report versus the earmarking that goes on all around us. It is a two-sided process, on one hand an attempt at objectivity and on the other an attempt to guarantee that projects, regardless of rating, will be funded. I think many agencies attempt to do both, doing as well as possible on the rating criteria and trying to get earmarked.

The UMTA ratings in the 3(j) report are done annually. Each project is summarized individually, and all the projects are compared with each other on the basis of six factors - capital costs, cost per new trip, percent local overmatch, a ranking of the relative adequacy of

capital financing, and the stability and reliability of the O&M funding. These are the criteria you have to meet and will affect how successful your project will be coming out of the 3(j) process.

I have personal experience with 13 projects--three projects through system planning, nine projects in Alternatives Analysis and one just finishing preliminary engineering. I have worked either as project manager or as a consultant. It is a massive effort that we collectively face, but it is a very important decision that we jointly deal with. We have to do as good as job as possible.

There are varying local financial capacities in the projects that I have been associated with. It is not just limited to those who have a guaranteed revenue source, because in many cases even those who have a guaranteed revenue source do not have adequate financial capability to fund both capital and on-going O&M. Then the question becomes what are our desires between our on-going needs and our desire to become a New Start or adding a new investment.

Issues - No set of guidelines will prepare you for all of the issues you will encounter. The first issue is developing the financial model. I remember in reviewing the UMTA Guidance that during Alternatives Analysis you refine the financial work done in system planning. There often is no system financial planning. You are starting from scratch, in many cases, in developing a financial model, or in taking a model that was a very rough tool in the short range transit plan and changing its entire capability. It is an undertaking that should be taken seriously, but one that should be with you for a long time. So, the development of a financial model is important. I think the types of projects that are going through system planning today require some form of financial analysis modeling capability. However, those agencies today which have such a model are those which have a guaranteed revenue source

that will fund a 20- or 30-year transportation program that includes major fixed guideway investments.

The second issue is defining roles and responsibilities. Typically, this is the conflict that happens when the transit agency is not the agency making the funding decision or which has the financial analysis model. Often, the MPO is involved. Sometimes the transit agency has its own model, but it is not an UMTA-approved model. How do you get the model in shape to match UMTA's requirements, particularly as you go through Alternatives Analysis?

Next, setting expenditure priorities. This is something you really have to deal with. This is not just a tradeoff between O&M and capital funding. Even within capital there are relative priorities. You will have dollar requirements to fund your on-going system. For example, I have been involved in a transitway Alternatives Analysis where the fixed guideway investment is the third tier in investment for receiving any funding. I think this is the way UMTA prefers to see this, and clearly this is what you will have to consider--what are the tradeoffs between on-going needs and the fixed guideway investment?

Targeting and Securing New Sources of Revenue -The complexity on this issue ranges widely. Sometimes a guaranteed revenue source and a prepared plan for voter consideration very often constrains what are the priority corridors, the phasing for implementation and the modal technology. What decision is left by the time you reach Alternatives Analysis? This is something that UMTA and local proponents must deal with realistically. If the voters are expecting a rail plan and a legally binding commitment has been made to such a plan, many want to know why you are bringing a busway alternative into the analysis process. This is often difficult to understand at the political and public level. Sometimes there is a system plan that has been based on a rail horizon

for the 20-year future. Wouldn't this plan bias the results of an Alternatives Analysis? The plan sources themselves are often mode-constrained.

Fare policy - Many agencies do not change their fares for inflation, and yet at the same time we are dealing with O&M costs that are subject to inflationary pressures. We are also sometimes constrained by fare box recovery factors that are mandated by policies, and we thus must meet these recovery ratios. If we work with the outcome of the travel demand forecasting model, one suggested financial performance criterion is to look at the realism of fare box recoveries by the time we get to the financial plan.

Private sector - This includes looking at the private sector for funding (e.g., value capture and joint development) and for turnkey financing and in some cases fully privatized projects. This provides us with some interesting issues that the process is not able to deal with yet. Turnkey approaches might only be worthwhile if we do not have funding that can be provided upfront. There are a lot of tradeoffs we must consider. Is it worthwhile to pay higher interest for private financing, when if you waited several years you could do it with your own tax exempt funding.

Developing the financial plan - This is a consensual process that is not easy to deal with. This is a political and public participation exercise. It should be as real as possible in terms of what you can actually implement and what revenue sources you can secure.

Local overmatch - As I mentioned earlier, the "haves" have the advantage. You can take a related, complementary corridor, pair it with a corridor you are bringing into Alternatives Analysis and get credit toward your local match. It is a situation where those who have secured revenue sources for building a system have this capability. UMTA will have to work with us on seeing what is the relative equity in the overmatch policy itself.

Financial capability - Clearly, if you have the ability to finance a system, the next question is how do you assess financial capability? It is easy to fund the first to third projects, but what is going to happen to the agency's ability to build the project it was going to build in the year 2000 and all of those commitments it made to voters? So, we have adequacy of funding issues associated with the project and adequacy of funding issues associated with the system.

Dallas provided a very challenging case on how you do the financial capacity analysis. You can not bring all of the committed local projects into the Alternatives Analysis; they are not built and you can not get credit for the patronage they will help you generate. Yet, you have to consider the local financial commitment to building these other projects. In Dallas, we looked at the overall system funding commitments in sensitivity testing.

Agency expectations - If you are the person doing the financial analysis, whether as an agency staff member or as a consultant, agency expectations on being able to fund the system can put you in an awkward position. Given that financial capability assessment occurs at the end of the process, you do not want to be the person to tell the Board that it can not fund the project, but yet the results of such financial analysis must be given to decision makers.

Risk assessment - Ed had some excellent comments on how to consider risk assessment and how to improve it.

There are several areas of research needs in financial forecasting. Some of these are not related specifically to financial analysis, but to our ability at looking at travel patterns and tripmaking generally. There is a need to improve our revenue forecasting abilities. There has been guidance on forecasting capital and O&M costs and how we should model these. On the revenue side, we can strengthen our abilities to do good revenue forecasting.

The issue of tradeoffs between land use policy, transportation and trip generation has a financing component in it, not just what is the land use pattern, but also if you will be deriving value capture financing and increasing the cost of living in certain areas by charging assessments or fees. Similarly, if we are going to have highway user charges and try to offset the differential between the price of transit for the user versus the price of a single occupant auto, we need better tools to look at this relationship. Last, we should learn from our own experience. We should always be looking at how accurate our forecasts are.

Remarks by Douglas Wentworth, Director of Finance, Sacramento Regional Transit District

The previous speakers have given you a comprehensive picture of financial planning for transit improvements. You may be asking, what is left? There are a couple of unique aspects of financial planning that I would like to discuss. One of these aspects is that it occurs at the tail end of the planning process. This happens if you're in systems planning, Alternatives Analysis, or further down the line. The primary reason for this is that financial planning brings together many of the ingredients that were developed in the preceding steps. It certainly brings together the results of service design which are needed to determine operating costs. It also brings together the results of the capital program--the engineering work which is necessary to develop your capital costs. It brings together the results of ridership estimates which are needed to estimate fare revenues.

Another unique aspect of financial planning is that it has to look at each year along the way. Some of the other steps in the process such as ridership forecasts traditionally concentrate on the horizon year. The capital and engineering work look at a project horizon year. Financial planning has to look at every year in between now and the horizon, because how you get there

financially is every bit as important as where you end up.

I would like to present some highlights, thoughts, and suggestions based on my several years of experience in long-range financial planning. I will discuss briefly several areas -- O & M cost forecasting, fare revenue forecasts, tax-based revenue forecasts, capital cost forecasting, dealing with uncertainty, and something I call "buy now, pay later".

O & M Forecasting: Most of us are familiar with the basic elements of operating cost forecasting. Just to refresh you a bit (see Figure 1), we start with service attributes which we get from our service design. The most common attributes being vehicle-miles, vehicle-hours, and some others. We multiply these by productivity factors such as gallons/mile, operators/hour, etc. to get resource units. This produces resource units -- the number of staff positions, gallons, kilowatts, and whatever else we are going to need to implement the future plans. Then we multiply resource units by unit cost rates such as costs per gallon, wage rates, and fringe rates to get costs. This process is repeated for each major mode in the system such as local bus, paratransit, express service, rail, and so forth and it is also repeated for each year in the process.

One of the fundamental things you need to do O & M forecasts is something called cost allocation (see Figure 2). Basically, cost allocation is taking costs that your accounting department (or an accounting department from another agency which is running a mode that you are looking at) and accumulating and allocating them by mode types (local bus, express bus, rail, etc.). This goes through a rather intricate process, but it is very important that one be able to do this, because the cost characteristics of the different modes can be quite different.

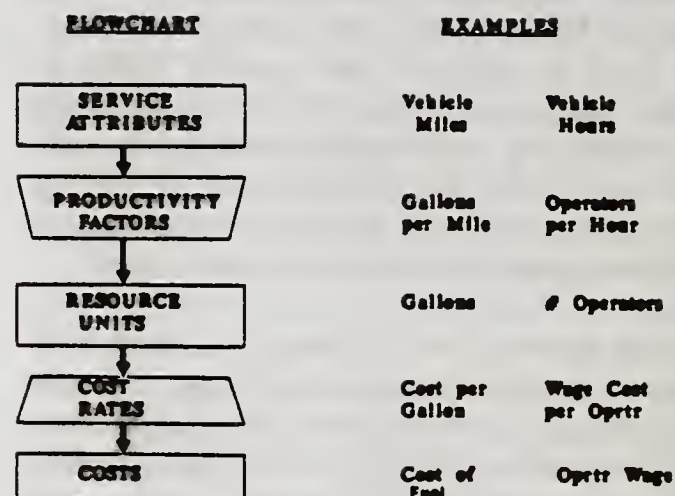


Figure 1-Operating Cost Forecasting

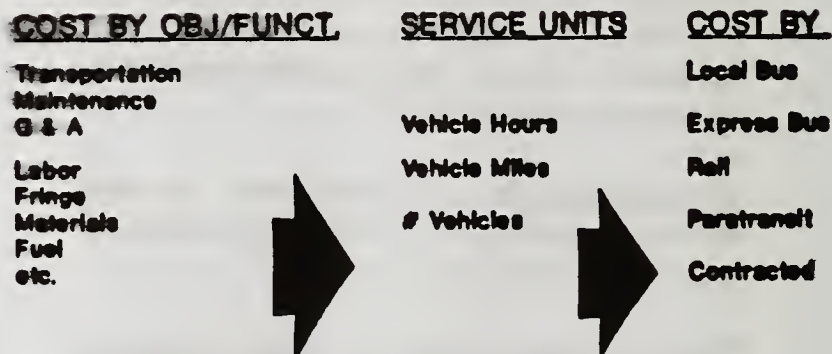


Figure 2-Cost Allocation

Let me highlight something called "economies of scale". This is important to watch for in O & M forecasting. Figure 3 shows a peer analysis, using data right out of the Section 15 report. Each of the squares represents a different transit agency, the x-axis is capacity-miles which is a measure of the amount of service provided and the y-axis is annual operating costs. The unique thing about this figure, and peculiar to the transit industry, is that there is a linearity in operating costs. What this says is that the bigger a transit agency gets, the more it costs to operate the system. If your operating costs forecasts do not seem to be linear, you might want to ask yourself why your agency should be different than other transit agencies?

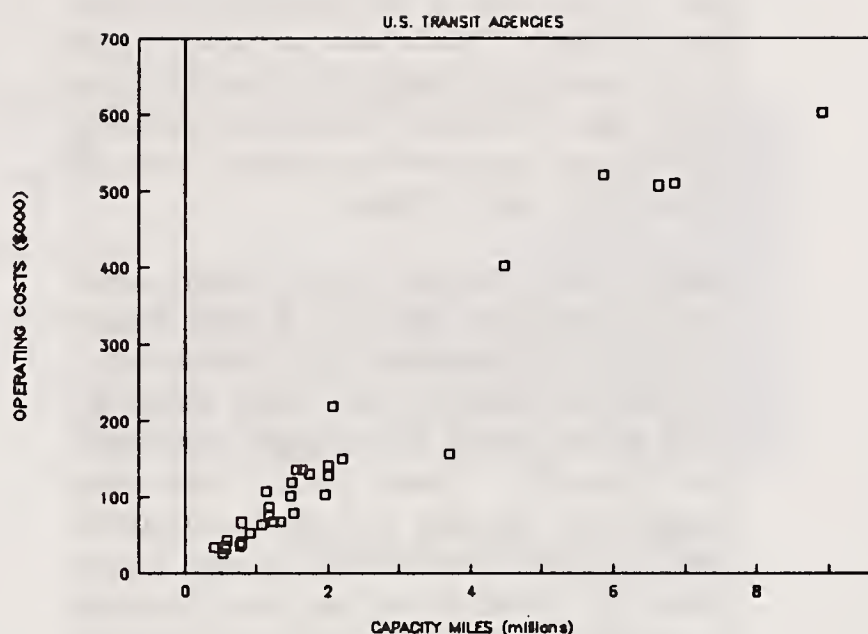


Figure 3-Peer Analysis

Figure 4 illustrates another point that I would like to make. As I said before, how you get to the horizon year might be as important as your financial position when you get there. There are three curves in Figure 4, each starting and ending at the same point, but there are at least three ways to get there. If we are very aggressive and we want to put out a lot of service in the early years, the costs for that service will recur year after year. It's going to be a lot more expensive and it will consume revenues a lot faster to increase service in early years rather than later years. Sometimes it is important, especially if your resources and costs don't balance, to re-examine this time stream of revenues and costs.

Fare Revenues: The thing to keep in mind with regard to fare revenues is that there are three ways fare revenues can change. Looking at the left bar in Figure 5, which is the present time, if we do not do anything, the real value of our fare revenues actually declines. If we implement periodic fare increases, we can at least keep even with inflation. Another way to increase fare revenues is to increase ridership.

There is still another way which is a change in rider mix. What typically happens in future service improvements is that you are expanding

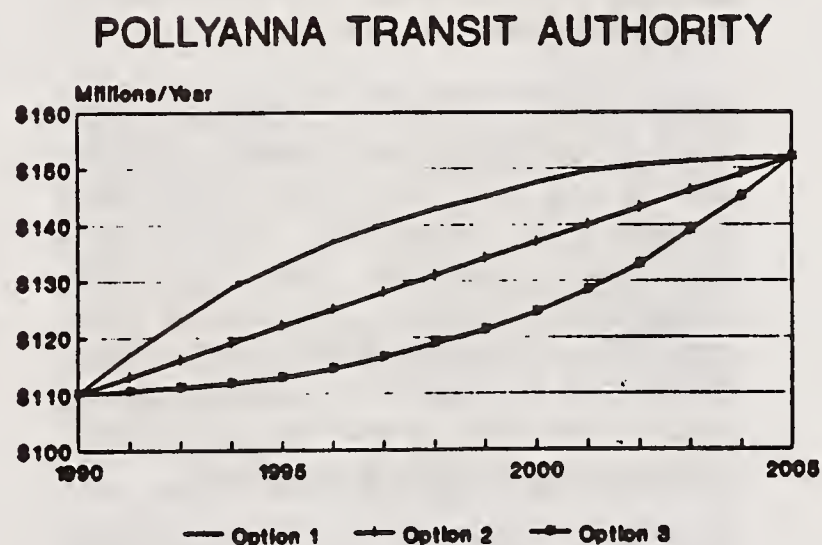


Figure 4-Financial Forecasting

your service, usually getting longer passenger trips. If you have, or will implement, zone or premium fares, chances are you can increase fare revenues by increasing the proportion of the longer trips (with higher fares) in your ridership mix. This will also cost more money, but it will give you more fare revenues.

Something else to watch out for is forecasting fare revenue from the travel demand model. There are some fundamental differences between real life fare structures and those which the travel demand model is attempting to represent (see Figure 6). Travel demand models are getting better, but they typically try to express fares in a zone-to-zone matrix, in other words, it costs "x" dollars to get from zone A to zone B. In real life, the fare structure is a bit more scrambled than that. We have discounted fares, special pre-paid fares, you may or may not have zone fares, special service fares and transfer charges. The travel demand model can accommodate some of these things quite well; others it has trouble with. My advice is to see what the demand model will give you in your base year for fare revenues, then figure out why there is a difference (if there is).

Figure 7 shows a checklist of things to think about in developing fare revenue estimates. Look at how your future cost recovery ratio compares to the present ratio. If it is a great deal bigger, be suspicious. Look at your future average fares compared to today's in real dollar terms. Think about how the fare structure might change over the years with a different service pattern. Also look at how changes in future transit rates might affect average fares.

You have heard the term "compounded optimism". Figure 8 shows a comparison of real life versus something that was forecast. I assure you that if you ever have the chance of going back to some of your past forecasts to check how close you came, it can be an both amusing and a painful experience. One of the things that always becomes apparent is that in

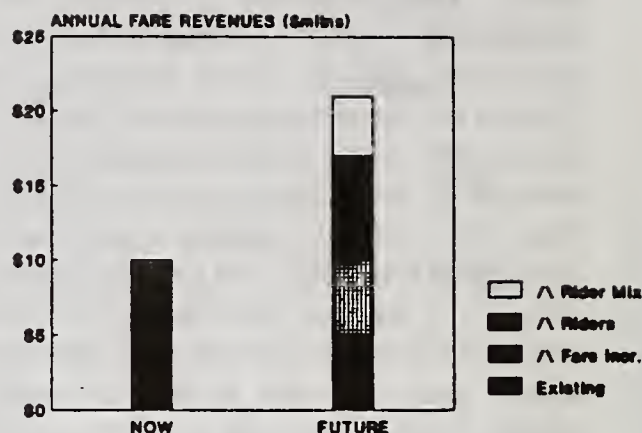


Figure 5-Growth in Fare Revenues

TRAVEL DEMAND MODEL	REAL FARE STRUCTURE
• Uses Zone-to-Zone Matrices	• Many Fare Categories
• Uses Averages for Prepaid and Discounts	• Discounted Fares (Seniors, Youth, etc.)
• Has Difficulty with Zone Fares	• Prepaid Fares
• Can Assess Transfers	• Zone Fares
• Can Assess Service Types (Express, Rail, etc.)	• Special Service Fares
	• Transfer Charges(?)

Figure 6-Forecasting Fare Revenues

- How does Fare Recovery (Cost Recovery) Ratio compare with present?
- How does Average Fare (in real \$) compare to present? (boarding vs. revenue passengers)
- Is Fare Structure likely to change? (new service types, zone fares, etc.)
- How will change in future transfer rates affect average fares for boarding vs. linked passenger trips?

Figure 7-Forecasting Revenues Checklist

real life there are good years and bad years. What the term "compounded optimism" means is that forecasters tend to take each of the driving variables in the financial forecast and make the most realistic yet slightly optimistic forecast that they think applies. Then they assume that these optimistic values will apply consistently year after year. One of things that should be examined is how robust or resilient are our financial forecasts? What would happen if we had a few bad years along the way? Are we still going to be financially viable? Maybe we can change the project phasing to improve our financial standing, or are we close enough to the edge that we could be in serious financial trouble if conditions are not just right?

Another concern is what I call the "financial viability Catch 22". In order to implement our long range plan, we need a new revenue source somewhere along the way. We also have to show UMTA that we have a financially viable plan which means that we have the revenue sources identified. If we have to go to a general public referendum for such revenues, they would like to know that we have financial participation from the federal government. In order to get that participation, of course, we need a secured tax-based revenue source.

Even the private sector can enter the equation. The private sector won't be particularly excited about participating in a project whose funding is uncertain. I do not have an answer to this problem, but perhaps something like obtaining conditional commitments from all the parties concerned would help. In other words, if the other parties do their share, we will do ours.

Capital Cost Forecasting: Differential inflation is one of the important concepts that has not been discussed yet. Such things as right-of-way, construction, and procurement of vehicles may inflate differently. We have not talked a lot about inflation, but it is certainly something that must be considered, particularly where there is

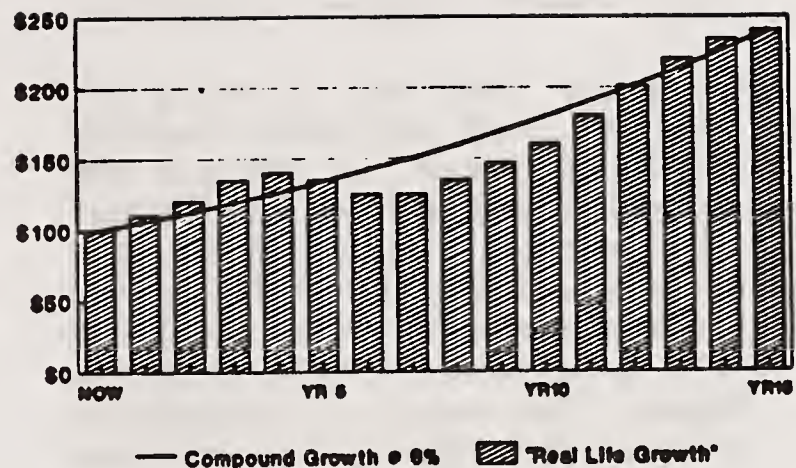


Figure 8-Compounded Optimism/Growth

potential for differential inflation. The only hangup here is that it is hard to predict inflation to begin with and sometimes even harder to see what the differential might be. But we should think about how different inflation rates will impact the cash flow.

Make sure some of the newer federal requirements are included in your cost forecasts, particularly capital cost forecasts. The ADA requirements will heavily influence vehicle and station designs. Alternative fuels will be a big factor in bus costs. DBE and Buy America requirements are more stringent than they used to be. Toxic waste cleanup is important, especially if you are contemplating using an old railroad right-of-way.

Ask yourself if capital replacement costs are included? In a 15-year plus timeframe you will certainly have bus replacement costs, but if you go to a longer timeframe you will want to make some provision for capital cost replacement. Maybe it is a sinking fund, or perhaps some way of accumulating capital for this eventuality. Then ask yourself about contingencies. Some of my suggestions are 30% in the concept phase, 20% in the preliminary engineering phase, and

10% in the final design phase, although this should be increased if you will be having difficult right-of-way acquisitions. Figure 9 presents a checklist for capital cost forecasting.

Uncertainty: Some ways of dealing with uncertainty include contingencies sensitivity analysis, risk analysis, and interaction with decision makers. Risk analysis is nothing new, it has been around in various forms for quite a long time. Figure 10 provides the best illustration of what risk analysis is all about. There are two probability distributions shown in Figure 10. One curve is for costs and one is for revenues. The interesting thing about these curves is that they both have the same most likely value. Remember these curves could represent any of the driving variables in your forecasting model. The most likely values are going to be the ones that you put into a simple discrete variable model and those are the ones that the decision makers might see. But, there may be important variations behind the scenes. Notice in the Figure that the cost distribution is skewed to the right and the revenue distribution is skewed to the left. This means that the average value of revenues is further to the left of your most likely value, and the average value of your costs is to the right. Risk analysis can take these kinds of probability distributions and gives you a bottom line in terms of a probability distribution. In this example, there might be a 30% chance that we are not going to make it financially on this project. We could go broke.

I have had mixed success in dealing with decision makers on the issue of risk analysis. There are several reasons for this. Some decision makers don't want to see anything but the "right" answer. Here's the "right" answer, now go tell us how you justify it. Probably a more common issue is that the concept of probability distributions is too complex for decision makers. Of course, we calculate risks in our lives every day. Weathermen always talk about an "x" percent probability of rain. Therefore, people do understand some aspects of

- Differential Inflation? (R.O.W. vs. Construction vs. Vehicles)
- New Federal Requirements? (ADA, Alt. Fuels, DBE, Buy America, Toxic Wastes, etc.)
- Are Capital Replacement Costs Included?
- What are Contingencies?

Figure 9-Capital Cost Forecasting Checklist

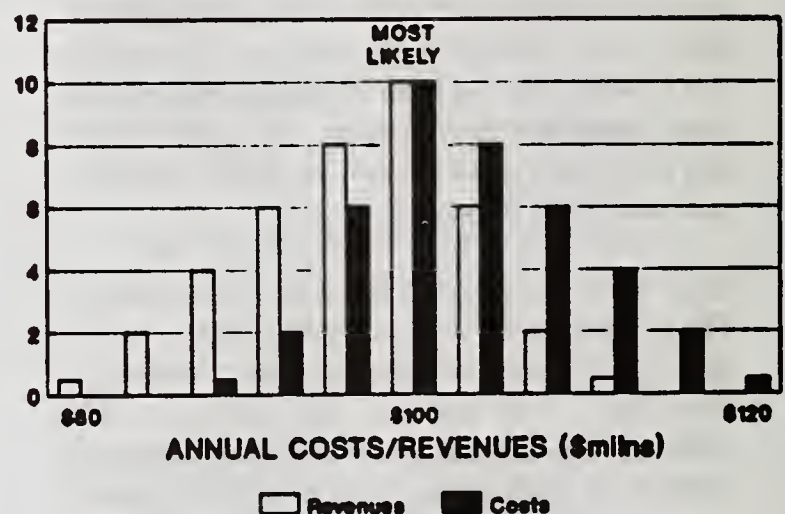


Figure 10-Revenue/Cost Distributions

the concept. You must work with your decision makers, senior staff, boards, policymakers, and the community to get them to understand this.

"Buy Now, Pay Later": Debt financing is becoming more common in transit, and I think we will see more emphasis on it as we see greater reliance on formula fund distribution from the federal and state levels of government. There are some new, innovative concepts in this area. I call one "investment pooling" where several transit agencies can get together in the issuance of a debt service instrument to fund purchases or construction. This is being done in California. The advantages are that you spread the risks and also spread the transaction costs of issuing bonds or certificates of participation.

Another new concept is the use of Section 9 revenues to service debt. In years past, we could not do this, but now UMTA is encouraging it.

Certificates of participation, essentially a leaseback transaction, are also a relatively new mechanism for finance. The advantage of these certificates is that you don't have to go to the voters as you do with general obligation or revenue bonds.

The last mechanism is cross border leasing. I must confess I do not know much about it. It does have some advantages. What you are doing is basically selling (for a "profit") the depreciation rights in a certain asset that you are procuring, such as rail cars, to a foreign equity investor. It is not unlike the old Safe Harbor lease, but I can assure you it is a lot more complicated. There are, of course, risks associated with this mechanism as well.

I have given you a potpourri of ideas and suggestions. Hopefully, some of this will be of interest as you begin your discussions in the breakout groups.

FINANCE BREAKOUT SESSIONS

"Don't be afraid to dream, but dream realistically"

Any transit project requires some level of funding to support its construction and subsequent operations and maintenance. This workshop explored several questions relating to the characteristics of successful financing and of the existing UMTA policies relating to local finance strategies and financial analysis.

What financial planning activities should occur during each stage of fixed guideway planning?

Financial analysis is very important for transit planning. Even where dedicated sources of funds exist or where the investment decision is considered to be, by definition, for the public good and thus "costless", financial analysis should be part of the decisionmaking process.

The degree of importance of financial analysis varies from city to city. However, in many situations, the Alternatives Analysis process is inconsistent with local financial efforts. One needs a project definition to get local funding support, but then UMTA opens the question of mode selection in the AA/PE process and requires consideration of the TSM alternative. How can we talk realistically about finance to local officials when we don't know what we are building? We cannot choose a mode before AA/DEIS, but it is confusing to the public if we do choose a preferred alternative after AA/DEIS and then introduce TSM during PE.

An early focus on financing in the decisionmaking process helps bring realism to planning, but excessive/premature focussing on how to pay for a project rather than on what is needed can unnecessarily restrict the types of improvements to be considered. Financing O&M needs cannot be forgotten, and can be even more important than financing the capital program.

"Reality checks" should be included in the planning process to make sure the project planning is realistic. Aim high, but realistically high. Develop funding strategies to pay for an adopted project, and avoid unrealistic expectations that cannot be achieved. Specific workshop participant observations relevant to financial analysis include:

- Realistic capital and O&M cost throughout the planning process are important so that the public and local decisionmakers have reasonable expectations of what revenues are needed.
- Financial planning needs to be undertaken in system planning to assist decisionmakers and the public in identifying what they can afford, if you will, or conversely, what must be done to raise the funding required to build the type of transit improvement identified.
- The timing of when you need to have a local funding source in place and a legally binding commitment with the community and a commitment with the federal government is a critical issue.
- Flexibility is essential in where and how financing should be obtained.
- Good financial practices in running the existing transit system should be a prerequisite to taking on major financial commitments.
- Thinking big or small may depend on whether there is a real advocate who can marshal local financial support.

Are UMTA's financial planning requirements realistic?

UMTA's current financial planning requirements are good although they could be strengthened. In particular, there is a serious need for the financial analysis process to incorporate replacement costs and to look at leveraging existing agency assets for financing the proposed project. In addition, UMTA might want to ask for financial benchmarks to be able to compare one agency's program with others. It is important that the AA/DEIS project planning process be integrated with an agency's on-going financial activities.

What are the proper institutional roles for the MPO and operator/implementer in financial planning?

Clearly, the appropriate role for the MPO will vary with the institutional and political characteristics of different localities. There really is no one role for the MPO to play. If the MPO is given a role in the transit financing and project development process, clearly it must have the authority and financial support to carry out this role. The organizational responsibilities should be made clear to all agencies involved with the project. There is a strong need to avoid competition between MPO's and transit authorities, and thus this is another reason why the role of the MPO should be well-defined. In particular, where there are multiple transit agencies, the MPO should play a more active role in the Alternatives Analysis process.

How can cities generate local support for new funding sources?

Successful local financing of transit projects requires the political support of local officials and of key constituency groups. The transit industry and local transit agencies need to learn how to sell transit. Many local officials have no idea what transit does or what it means to the

local economy. The benefits to users and non-users alike need to be marketed. For example, New York City used an argument of maintaining international competitiveness as a reason for supporting mass transit.

As part of this marketing effort, transit agencies should make a conscious effort to expand the constituency for transit services. Besides the traditional transit dependent and elderly groups, other possibly strong constituencies for transit include the disabled, employers, commuters, and environmentalists.

An important characteristic of the transit finance environment is that it competes with many different, non-transportation items on the local budget. These items include health and education, areas that have large, and historically active constituencies. Therefore, transit agencies must adequately demonstrate the need for transit projects, show what the project(s) can do, and avoid developing a wish list that is unrealistic with regard to local financing capability.

Some specific strategies that can be used to elicit local support to fund transit projects include the following.

- * Use a demonstration project to show what the project can do and to illustrate the ability of the transit agency to develop and operate such a service. One transit agency is doing this with a three-mile starter light rail line to convince local officials that a much larger system is worthy of public support. Of course, the success of this strategy is based on choosing a demonstration project that is likely to succeed.
- * Link transit funding with other transportation programs so that voters and local officials view it as a total package. The recent referendum of a transportation bond issue in California did just that.

- * Emphasize the potential loss of federal funds if the project is not adopted.
- * Develop an appropriate strategy for tapping into local sensitivities about local funding. For example, one tourist city proposed to use a sales tax to support a transit project because it determined that the voters would accept tourists paying for the local project.

Does the UMTA process provide sufficient flexibility for considering private funding alternatives?

The important question with regard to the role of private sector funds within the context of financial planning is how to make it happen? How to encourage the private sector to contribute funds? It is important to acknowledge that there are many public sectors as well as many private sectors. We must have a realistic view of the private sector role in funding. A turnkey project, for example, is not private sector funding of a project. Such a project perhaps reduces costs because of greater efficiencies, but there really is no new money contributed to the project. The concept of turnkey project development should therefore be viewed separately in a discussion of private sector funding options.

Obtaining private sector funding or acquiring a certificate of participation is best done by agencies or representatives of agencies that know how to put together the necessary deals. Developers are often responding to things other than the benefit to transit that accrues due to their contribution. For example, the contribution is often made in exchange for some concession on zoning. Because of these different motivations for participation, there needs to be a new deal-making process used in negotiating private sector funding contributions, one that reflects the current deal-making process in private deals. This new process has four major steps:

Letter of agreement/intent: The agency wants to undertake a project and the private developer wants to develop a site. This level of negotiations simply acknowledges the fact that there are some things that need to be done if the deals are to be made.

Due diligence: In this step of the process, the private developer evaluates options, looks for pitfalls, assesses risk and evaluates his/her ability to undertake the deal. This step in the deal-making belongs in the Alternatives Analysis process. All groups that are party to the deal need to say that they are willing to participate.

Closing: This occurs at the end of preliminary engineering and, in essence, represents a commitment to undertake the deal. Sometimes the deal does not happen.

Funding: The actual exchange of funding represents the final step. This may actually occur after construction or over many years.

The above process is an iterative one and requires that at least three groups be involved--the developer, the transit agency and UMTA.

How should uncertainty in costs and funding sources be dealt with?

Uncertainty is inherent in the Alternatives Analysis process. Given finite resources and a specific financial plan and proposed project, there needs to be a greater focus on uncertainty. The agency needs to do a better job of estimating capital costs. Perhaps additional engineering, soils tests, mapping, or utilities work should be undertaken to obtain better estimates. One area that needs closer examination is the impact of assumed land prices. The very act of looking at an area for potential construction can increase land values. What could be done to better manage land prices, perhaps through zoning or advance acquisition? On the revenue side, one might need better employment estimates especially

relating to location and income levels.

We need to focus on better planning methods and techniques to reduce uncertainty in the planning process and in the products of that process.

Are the criteria UMTA uses to rank financial viability in the 3(j) report fair and reasonable?

The existence of a sound financial plan is one of the criteria used by UMTA to rank financial viability. This criterion seems a fair one, but the timing and appropriateness of this criterion depends on when the actual evaluation takes place. Good financial planning may not occur until the Alternatives Analysis process. As mentioned above, however, financial planning should occur earlier so that the decisionmakers know what funding is necessary to support a transit investment, without this estimate biasing the resulting selection of alternatives. There is a sense that this criterion, similar to overmatch, presents a strong bias toward those agencies having a dedicated tax.

One of the advantages of pursuing a dedicated local funding source in the context of these UMTA funding criteria is that once the capital investment is over, the funds could still be available to support O&M costs.

Another consideration that is important is that the differential in federal matching ratios presents pressure from local sources to put local revenues in those projects that will maximize federal dollars. In the case of highway projects, there are several categories of federal aid highway projects that provide a greater federal contribution than that for transit capital investment.

Is UMTA's Overmatch Initiative succeeding in attracting greater local funding to transit?

One's opinion of overmatch seems to depend on whether your agency has the funds to provide

the overmatch. There is a sense that the overmatch criterion is confusing and hard to apply. How is it related to a specific project? Can it be related to a broader undertaking? Does one get credit for overmatch given the region's history of strong local funding commitment to transit projects? There is a strong feeling among transit agencies that the Overmatch Initiative is inherently unfair. Those agencies which have a dedicated local tax revenue can afford an overmatch, while those without such revenue cannot. This would seem to bias federal decisionmaking toward larger systems at the expense of smaller cities, especially if credit is given for large local programs or historical local contributions. Many cities seem to target their overmatch contribution, in a strategic decision game, in a bid to see how high on the 3(j) list they can get. There is a need for UMTA to clarify the definition of the application of the overmatch criterion.

Is Overmatch working? There are several cities that have provided greater-than-required local share. However, these cities either had done this earlier already or would likely have done so in the absence of the Overmatch Initiative. The Overmatch Initiative has encouraged other cities to follow suit. In those cases where local overmatch was provided, UMTA review of technical reports was expedited.

FUTURE DIRECTIONS BREAKOUT SESSIONS

The final breakout session focussed on future directions and recommended activities. Because of the nature of the questions, the participants answered the questions in bullet form and will be presented in similar fashion here.

What topics are the highest priority for detailed technical guidance?

- * System planning
- * Unified DOT guidance on multimodal planning
- * Air quality analysis
- * Turnkey project process
- * Preliminary engineering
- * Environmental analysis

What additional training or information should UMTA provide and how can existing training courses be improved?

- * Provide information on methods reports or EIS chapters that are considered to be well done.
- * Provide opportunities for transit planners to share experience with travel demand forecasting packages.
- * Develop a 1/2 day workshop for local officials that precedes the 2 1/2-day UMTA AA seminar. Issues in this 1/2 day workshop would focus on the those of primary concern to local decisionmakers like land use and economic development impacts and on issues that are of importance to make any fixed guideway investment work like zoning and parking management policies.

- * Use the Financial Planning chapter in the Guidance as the focus of a workshop and allow participants to critique and improve it.
- * Develop a seminar on system and multimodal planning.

What research should be undertaken by UMTA?

- * Catalogue real experience of existing fixed guideway systems, such as physical characteristics (# of vehicles, # of rail vehicles, etc.), O&M characteristics, ridership and environmental impacts.
- * Better understand the relationship between system planning and AA.
- * Develop a methodology and criteria for undertaking a true multimodal planning process.
- * Examine forecasts and real experiences to determine how close forecasts came to reality. Determine what factors affected forecast values.
- * Examine why transit/auto users make modal choices.
- * Examine the dynamics of peer review procedures in AA.
- * Conduct small area studies on transit's impact on land use impacts including the importance of complementary policies like land use controls and parking management.
- * Better understand how transportation demand management fits into travel demand forecasting with special emphasis on parking and land use controls.

- * Examine how Canada and Europe integrate transportation and land use planning.
- * Conduct an independent review of organizational issues associated with AA, design and construction.
- * Conduct before and after studies on costs and mitigation strategies.
- * Examine the impact of quality of service on travel user decisions.
- * Examine transit implications on urban design, e.g., the role technology plays in station location.
- * Develop a more formal information dissemination mechanism within UMTA.
- * Develop in a joint process (with AASHTO, APTA, TRB, etc.) for developing research priorities.
- * Pool research dollars with EPA and FHWA to examine issues in air quality.

What else should APTA's Major Capital Investment Planning Subcommittee and UMTA be doing, either jointly or alone?

- * Develop a layperson's brochure on the AA process.
- * Develop a report that evaluates past AA practices.
- * Provide a list of project managers for projects in the 3(j) report.
- * Develop a document that discusses strategies to educate the media (perhaps in conjunction with the first recommendation).
- * Develop a newsletter or circulate summary of newsletters developed by consultants.

- * Create an electronic bulletin board which discussed national AA activity to help local officials better communicate and understand the AA process.
- * UMTA should pursue better cooperation with FHWA.

What specific topics should be addressed at a conference session at the next APTA conference?

- * Overview of the AA process and its evolution.
- * Summary and outputs of this workshop.
- * Why the AA process is so important to federal, state, and local officials and its relationship to national legislative priorities (e.g, Clean Air Act).
- * Examination of the Canadian process for fixed guideway planning.

What can be done by UMTA and the industry to correct the erroneous impression that current forecasts are significantly flawed?

The transit industry should not dwell on the critical reports. There should be an understanding with UMTA that there are uncertainties inherent in the forecasting process.

At the local level, there should be more conservatism in the forecasting process with more sensitivity analyses undertaken. It is important not to let advocacy push the forecasts. In this regard, a previous suggestion of providing an opportunity for local decisionmakers to participate in the UMTA briefing should be considered seriously. Local transit agencies also need to play an advocates role in initiating local actions like parking management and zoning changes that will be complementary to the intent of the fixed guideway investment.

What should UMTA's role be in serving as a clearinghouse for data and in improving the AA process?

UMTA has an important role to play in providing information on good practice to those involved in AA. UMTA should develop a local agency technical assistance program similar to PPTN that will loan people familiar with system planning and AA to local agencies. UMTA should take the lead in promoting strategies for checking the credibility of the local process and forecasts such as the development of peer review groups. UMTA should also develop a project information data base which provides status and contacts for current projects, perhaps updated quarterly. And as noted above, UMTA should play an active role in sponsoring research that will benefit the industry.

Should future workshops of this type be held, and if so, on what topics?

This workshop should be evaluated to see if the format and timing are appropriate. Some participants felt that as a "tag on" to the Rail Conference the workshop made the time commitment for those who attended both meetings too long. However, there was general consensus that this workshop was excellent and should be continued at regular intervals. Most recommended that such workshops should be held at least every two or three years, while others suggested that they be held only when there are major policy changes being considered. For example, there was general consensus that if and when UMTA considers changing the rating scheme, the transit industry should be involved in the process. A workshop should be held which focusses industry response to proposed changes.

Technical workshops should be held more often and should focus on such things as:

- system planning
- patronage forecasting
- O & M estimating
- environmental impacts
- financial planning

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